THE IRON TRADE REVIEW

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RAIL ORDERS

ARE TESTING THE CAPACITY OF THE MILLS THROUGHOUT THE COUNTRY.

Manhattan Bridge Will be Built by the Pennsylvania Steel Co.—Strike of Structural Iron Workers not Causing Much Trouble.

The strike of the structural workers against the American Bridge Co., which went into effect last Thursday, has not caused any disastrous results, and indications are that fears of serious embarrassment of building operations will not be realized.

Manhattan Bridge Contract.

The demand for structural material continues with increased force. The most important contract of the week is that for the Manhattan bridge, which will require 43,000 tons of steel. The contract was awarded the Pennsylvania Steel Co., Wednesday. Large premiums are being paid for prompt delivery of structural material, ranging from $4.00 to $10.00 per ton.

Demand for Steel Rails.

Inquiries for heavy tonnages of steel rails are pending. One New York office reports that it has received an inquiry for 75,000 tons from a system to which it has recently sold 20,000 tons. In Chicago orders for 20,000 tons have been placed within a few days and inquiries for 150,000 tons are pending. Some railroads are willing to pay premiums for prompt shipment. As all available mills are rolling standard sections, it is difficult to meet the demand for light rails, and one large producer is unable to promise delivery of rails of less than 45 pounds before the first of October. Rerolling mills are getting considerable business on account of the unusual conditions prevailing. The bar situation is very strong. The Carnegie Steel Co., has put its new bar mill at Clairton into operation, and all plants are being worked to their limit. The price of light rails, less than 45 pounds, has again been advanced $1.00 per ton. The scarcity of billets continues. Specifications in contracts for hoops have recently been very heavy.

Pig Iron Is Firm.

The buying of pig iron continues steadily, but not in large quantities. In New York orders for about 50,000 tons have been placed, of which 28,000 tons were basic. Bessemer pig iron is firmer, and there is apparently a scarcity in the East, as some shipments have been made from Ohio furnaces. A noteworthy feature of the market is that buyers of all grades are eager for prompt delivery on contracts. Charcoal furnaces report sales are satisfactory, one company having disposed of about 40,000 tons recently. That tonnage was divided between the car wheel manufacturers, malleable manufacturers, engine and steel roll manufacturers, malleable interests being especially heavy buyers. While concessions on all grades, North and South, are occasionally made on orders for prompt shipment, the furnaces are not anxious to contract for future delivery at lower prices than those recently quoted. The announcement that the Iroquois Iron Co., will build another blast furnace near Chicago and that M. A. Hanna & Co., Cleveland, are looking for a site shows the growing importance of this district in the manufacture of pig iron.

The Coke Situation.

The market for coke is firm. An interesting feature is that an important Eastern consumer is negotiating for a large tonnage on a sliding scale based on the price of pig iron. The trade in old material is fair and the market firm, while on some kinds of scrap, prices are advancing.

NEW BLAST FURNACE

Will be Built by Iroquois Iron Co.—M. A. Hanna & Co. Looking for a Site.

Chicago, Aug. 16.—The Iroquois Iron Co. of Chicago will build another blast furnace. The location of the stack has not been made public, except that it will be built in South Chicago. The furnace will be of modern dimensions with a capacity of not less than 300 tons a day. Construction work will be commenced early in the fall. The two other furnaces of this company at South Chicago have an advantageous location on the Calumet river, but it is doubtful if there is room on this site for a third stack without considerable remodeling of the entire plant. This plant has been considered along with several other sites, but no information is ready to be given out as to the decision the company has reached in this connection.

It is known that M. A. Hanna & Co., of Cleveland, have for some time been examining various parts of the Calumet district with a view to building a blast furnace there. Indiana harbor, it is said, has been favorably considered, because of its fine breakwater, deep harbor and excellent railroad facilities.

Republic Extensions.—The Republic Iron & Steel Co. has bought a tract of land on the South side of the Mahoning river, Youngstown, O., below the works of the National Tube Co., near Lansingville, comprising 57 acres, on which it proposes to build whatever extensions may be projected in the near future. The reports that the land was bought for the purpose of erecting rod and wire mills on same are denied.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Carnegie Steel Co. Starts its new Bar Mill—Demand for Pig Iron is Light.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, August 16.

While there has been an air of expectancy during the past week, the actual business done outside of the finished products has been extremely light, the only ripple on the placid surface being the announcement made by The Iron Trade Review last week that the United States Steel Corporation will confer with the Bessemer Association late this month concerning the purchase of a large quantity of Bessemer iron. Comparatively little pig iron has been sold, and that only in small quantities, the condition being that only the larger foundries are busy, and these have bought up to requirements for some time to come, while the smaller concerns have stocks on hand to carry them through at least until next month, and they are not exhibiting a tendency to buy. Quotations on Bessemer and basic, as well as Foundry are about 25 cents lower than last week.

In finished material conditions have not changed materially and new tonnage is being booked right along, and one producer secured a premium of $4 per ton on a small lot of structural for prompt delivery. Other interests are not seeking premiums, as they are not in shape to promise quick delivery and mills are operating at full capacity to turn out orders already on the books. The unprecedented demand of agriculture implement makers has resulted in increased activity. The Crucible Steel Co. of America has started the Anderson-Dupuy works at McKees Rocks, Pa., and the Howe-Brown plant, Pittsburg, to care for the surplus work from its other works, which are being operated to their full capacity. The Carnegie Steel Co. has started its new 18 in. bar mill at the Clairton plant and with the two continuous heating hold fire, furnaces will have a capacity of 4,000 to 5,000 tons per months of bars from 1½ x 2 to 2 x 8 in.

Pig Iron.—But few sales have been reported within the past week, as consumers have indicated they are filled up to present requirements. The 10,000 tons of gray forge reported last week went to the United States Cast Iron Pipe & Foundry Co. under unusually favorable conditions regarding shipment. A considerable number of inquiries have been made, but they have not as yet resulted in business being done. One furnace has already contracted to sell 20 percent of its output for delivery the first half of next year, but prices were not announced. We revise quotations as follows:

Bessemer, Valley	$14.25
Bessemer, Pittsburg	15.10
No. 1 Foundry	$15.85 to 16.10
No. 2 Foundry	15.10 to 15.35
Gray Forge, Pittsburg	14.65 to 14.85
Basic, Valley	14.25 to 15.35
Basic, Pittsburg	15.10 to 15.35

Steel.—The demand for billets and bars continues without interruption and an advance of 50c is noted for open hearth billets. Bars, long lengths, are now quoted at $25, and cut bars at an advance of 50c. Bessemer billets are firm at $23 and open hearth at $24.50.

Ferro-Manganese.—The market has been quiet during the week and we quote $49 for immediate delivery.

Muck Bar.—The business has been so light that it is difficult to make a quotation, but the market would indicate a price of $26.75, Youngstown, or $27.70, Pittsburg.

Skelp.—Bessemer grooved is quoted at 1.50c and sheared at 1.55c. Grooved iron is quoted at 1.55c and sheared at 1.60c to 1.65c. The market has been quiet.

Rails and Track Material.—Light rails have advanced another $1, making an advance of $2 within the past month. This applies to all rails under 45 lb. The mills are running to capacity. The new mill at the Edgar Thompson plant of the Carnegie Steel Co. will begin operations about Sept. 1. On heavy stock no quotations have been made from producers in this district for 1906 delivery, but this business is expected to show within a short time. We quote:

Tank plates ¼ in. thick, 6¼ in. to 14 in., in 500 tons, $30; less than car lots, $32; light rails, 16 lb., $28 to $29; 20 lb. $27.50 to $28; 25 to 45 lb. $25 to $27; angle bars for standard sections, 1.25c; spikes, 1.70c.

Plates.—Plates are held to be stronger in the market this week than last and the tonnage continues to be heavy. We quote:

Tank plates, ¼ in. thick, 6¼ in. to 14 in., inclusive, 1,50c f. o. b. mill Pittsburg; over 14 in. up to 100 in., 1.60c. Extras are as follows per 100 under 3 in., 1.60c. The following differentials are maintained on steel: Less than 2,000 lb. of a size and not less 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, 10c extra; gauges 7 and 8, 15c extra; No. 9, 25c extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific Coast.

Bars.—The tonnage booked is already heavy and producers say the situation is very satisfactory. Prices have been maintained and delivery in spots is good where conditions are favorable, but on the average the mills are from six to eight weeks behind, depending upon size required. We quote:

Bar iron 1.60c to 1.65c Pittsburg; hoops 1.65c, and bands, 1.50c, both taking hoops and band extras respectively. Bessemer steel bars, 1.50c.; open-hearth steel bars, 1.50c.; plow and cultivator, 1.50c, net; channels, angles, zees and tees, under 3 in., 1.65c. The following differentials are maintained on steel: Less than 200 lb. of a size and not less than 1,000 lb., 10 cents advance; less than 1,000 lb. of a size, 30 cents advance.

Structural Material.—Producers are literally swamped with orders for structural material and the leading interest is not looking for further new business this year. For sheared plates there is a fair delivery in spots, depending upon size and shape, but on the general run the mills are full. Universal plates are as bad in this respect as structural iron.

We quote as follows: Beams and channels up to 15 in., 1.60c; over 15 in., 1.70c; zees, 1.60c; tees, 1.65c; angles, from 3 to 6 in., inclusive, 1.60c; universal and sheared plates, 6¼ to 14 in., inclusive, 1.50c; over 14 in., 1.60c, base.

Sheets.—Conditions have improved to a slight extent and more tonnage has been booked than for some little time past. On desirable orders of large tonnage a considerable concession from listed prices has been obtained.

We quote: No. 30, 2.65c; No. 29, 2.55c; No. 28, 2.40c; No. 27, 2.30c; Nos. 25-26, 2.25c; Nos. 22-24, 2.20c; Nos. 17-21, 2.15c; Nos. 15-16, 2.10c; Nos. 13-14, 2.05c; Nos. 10-12, 2c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 29, 3.70c; No. 30, 3.95c. Quotations f. o. b. Pittsburg, 30 days net, 2 percent off cash 10 days.

Wire and Wire Nails.—Although a little earlier than usual, most of the mills have resumed operation to meet the requirements of the fall trade and the market is reported in fairly good shape. The jobbers have begun to buy for their requirements and by Sept. 1 a good business is expected.

We quote: Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, and less than carloads, $1.95; painted barb wire, $1.95 for jobbers in carloads; retailers' carloads, $2, and less than carloads, $2.10, with 30c for galvanizing. Annealed smooth fence wire is held at $1.65, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron and steel cut nails, $1.70 to $1.75.

Merchant Steel.—The Crucible Steel Co. reports its works running to capacity and a brisk demand in all lines from tool steel to bars, with an increasing business. The tendency is for higher prices.

We quote: Cold rolled and ground shafting, 50 percent off in carload lots, and 45 off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.70c to 1.75c; toe calk, 2c to 2.05c.

Pipes and Tubes.—Boiler tubing still continues in strong demand and orders booked for a considerable time ahead. The National Tube Co. is now operating full in all departments. There is practically nothing being done in oil country goods. The concessions of about three points continue. Pittsburg basing discounts are as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	67	51	65	49
⅜ to 6 inches	75	65	73½	63½
⅜ and ½ inch	71	59	69	57
7 to 12 inches	70	55	68½	53
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	60	48	58	46
½ to 4 inches	67	55	65	53
4½ to 8 inches	63	51	61	49
Double extra strong plain ends, ½ to 8 inches	56	45	54	43

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1¼ inches	44	41
1¼ to 2¼ inches	56	41
2½ inches	58	46
2¾ to 3 inches	64	53
6 to 13 inches	56	41

Less than carloads 2 points less.

Old Material.—The stagnant condition which has prevailed all summer still continues and many of the dealers have given up trying to discover an explanation. The major part of the trading has been between dealers and consumers are taking but little scrap. We quote, gross tons as follows:

Heavy melting stock, $14.75 to $15; low phosphorus material, $17.50 to $18.00; rerolling rails, $14.25 to $14.50; cast scrap, $13.00 to $13.25; borings, $8.75 to 9.00; No. 1 Wrought, $14.50 to $14.75.

Coke.—The only feature in the coke market has been an indication of a large eastern consumer to forsake the methods in vogue in that part of the country to buy at a fixed price and adopt the policy of purchasing on a sliding scale, regulated by the price of iron. Negotiations for a large tonnage are now in progress. Prices remain about the same as last week, and furnace coke for prompt delivery is quoted at $1.75 to $1.90, according to quality and foundry coke from $2.25 to $2.40. For the week ending Aug. 5 the estimated production of the Connellsville region was 256,732 tons, a slight decrease over the previous week.

Sears & Roebuck, of Chicago, Ill., have purchased land near Mt. Vernon, O., and it is stated that they are planning to erect a stove foundry.

CHICAGO.

Heavy Demand for Rails—Softening of Pig Iron Prices is Noted.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, August 16.

Heavy inquiry for rails is the chief feature of the local market. At least 25,000 tons were placed last week, and fully 150,000 tons are pending. Most of the latter is intended for the Harriman Lines and contracts are expected to be closed up in a few days. If they go through, it will result in practically placing out of the market for the balance of the year all the mills of the leading producer. The South Chicago plant was sold up some months ago, and as the Republic and Colorado interests are declining further new tonnage, there will be created a situation without a parallel in several years.

Specifications for plates, structural shapes and steel bars continue to the full capacity of mills, few producers being in position to give deliveries within four to six months from date of order. Sheets and merchant pipe are ragged. While more or less cutting has been done during the summer by all makers of pipe, there is a disposition on the part of the leading interest to hold more strictly to card rates. Independent producers, however, continue to shade prices as high as $6 a ton. Demand for wire is good and prices are firm. The reports that the Republic Iron & Steel Co. is contemplating putting up rod and wire mills on the land recently purchased at Youngstown find no verification here and little credence is placed in them. With the continued heavy purchases of rolling railroad stock, bar iron grows stronger and Western mills are holding firmly to the 1.60c basis. Trading in pig iron is dull and quotations are susceptible to bearish talk. Scrap is without any consumptive demand to speak of, though the manipulations of local dealers are gradually forcing prices upward.

Pig Iron.—Transactions in pig iron during the week under review have been of small moment. Practically all the buyers in this territory have covered for their wants for at least two months ahead and the present lull was not unexpected. This apathy has created some weakness in values, and both Northern and Southern grades have softened to the extent of 25 cents a ton. The fluctuation, however, is not general, producers of the better known brands still holding to $12 Birmingham in the case of Southern irons, and $16.50 Chicago for same grade of Northern make. Another new furnace will be built in the Chicago district this year by the Iroquois Iron Co., making three furnaces under course of construction. There is a possibility of a fourth stack being added, but no details regarding it can be learned other than that M. A. Hanna & Co. is at the head of the enterprise. There is some inquiry for basic and silicon irons in this market. A transaction which has not been noted in these columns heretofore was the purchase several days ago of 15,000 tons of basic iron from the Tennessee Coal & Iron Co. by the National Enameling & Stamping Co., of St. Louis, the price being $13 Birmingham. We quote as follows:

Lake Superior charcoal	$17.00 to 17.50
Northern Foundry No. 1	16.75 to 17.00
Northern Foundry No. 2	16.25 to 16.50
Northern Foundry No. 3	15.75 to 16.00
Northern Scotch Foundry	16.75 to 17.00
Ohio Strong Softeners No. 1	16.80 to 16.80
Ohio Strong Softeners No. 2	15.80 to 16.30
Southern Foundry No. 1	15.90 to 16.15
Southern Foundry No. 2	15.40 to 15.65
Southern Foundry No. 3	14.90 to 15.15
Southern Foundry No. 4	14.65 to 14.90
Southern No. 1 Soft	15.90 to 16.15
Southern No. 2 Soft	15.40 to 15.65
Southern Gray Forge	14.40 to 14.65
Southern Mottled	14.15 to 14.40
Southern Silveries (4 percent to 6 percent Silicon)	16.65 to 17.65

Jackson Co. Silveries (8 percent to 10 percent Silicon)	19.30 to 19.80
Alabama and Georgia Car Wheel	20.15
Malleable Bessemer	16.25 to 16.50
Basic Iron	16.15 to 16.65

Billets.—An occasional order is booked by local sellers for forging billets, but aside from this no activity is noted in this product. Prices range from $30 to $32 Chicago. Rods are quoted $31 Pittsburg.

Bars.—Bar iron continues to more than hold its own in the local market and is quoted strongly at 1.60c Chicago. In this respect it is aided by the large orders for new rolling stock that are placed each week by the carrying interests. Contracts for 1670 new cars and coaches were placed with various builders last week, while bids are reported as having been asked on 30,730 cars. Among the latter are the 18,000 cars for delivery next year which the Pennsylvania is said to be figuring on. There is no let-up in the specifications for steel bars, which continue to the full capacity of all the mills. Some producers are from four to six months behind in their shipments with no hope of catching up. Prices are without change. We quote as follows on carload lots mill:

Our quotations are as follows: On carload lots, mill shipments, Chicago delivery: Bessemer and open-hearth bars and bands, 1.66½c base, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 1.81½c base, full extras. Store trade is active and prices are firm. We quote bar iron, 1.90c base, full extras; soft steel bars and bands, 1.85c to 1.95c base, full extras; soft steel angles, channels and tees, under 3 in., 1.95c to 2.05c; hoops, 2.20c base, full extras.

Sheets.—There is no appreciable change in the local situation. Demand is of good proportions, though prices continue ragged. Our quotations given below, while fairly representing the local market, can be shaded on desirable business. We quote carload lots, mill shipments, Chicago delivery, as follows: Blue annealed sheets Nos. 9 and 10, 1.81½c; Nos. 11 and 12, 1.86½c; Nos. 13 and 14, 1.91½c; Nos. 15 and 16, 2.01½c. On box annealed, one pass, cold rolled, we quote Nos. 18 and 20, 2.21½c; Nos. 22 and 24, 2.26½c; Nos. 25 and 26, 2.31½c; No. 27, 2.36½c; No. 28, 2.46½c; No. 29, 2.56½c; No. 30, 2.66½c. We quote on lots from warehouse stocks as follows: No. 10, 2.10c to 2.15c; No. 12, 2.15c to 2.20c; No. 14, 2.20c to 2.25c; No. 16, 2.30c to 2.35c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.85c; No. 28, 2.85c to 2.95c; No. 29, 3c to 3.05c. Galvanized sheets, mill shipments, Chicago delivery, are quoted as follows: Nos. 12 and 14, 2.41½c; No. 16, 2.56½c; Nos. 18 and 20, 2.71½c; Nos. 22 and 24, 2.86½c; No. 26, 3.06½c; No. 27, 3.26½c; No. 28, 3.46½c; No. 29, 3.71½c. Jobbers' prices on lots from store are as follows: Nos. 10 to 14, inclusive, 3.10c; No. 16, 3c; Nos. 18 and 20, 3.10c; Nos. 22 and 24, 3.25c; No. 26, 3.50c; No. 27, 3.70c; No. 28, 3.95c; No. 29, 4.40c; No. 30, 4.85c.

Structural Material.—The only statement that can be made is that specifications are without any diminution. New business is light, because with the exception of jobbing interests, prompt deliveries cannot be secured.

We quote, Chicago delivery, as follows: Beams and channels, 3 to 15 in., inclusive, 1.76½c; angles, 3 to 6 in., ¼ in. and heavier, 1.76½c; angles larger than 6 in., in one or both legs, 1.86½c; beams larger than 15 in., 1.86½c; zees, 3 in. and over, 1.76½c; tees, 3 in. and over, 1.86½c; with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. We quote prices from store as follows: 2.10c to 2.25c for angles, beams and channels, base sizes, with 2.20c to 2.30c for 18, 20 and 24-in. beams; tees and zees, 2.15c to 2.25c. These prices are for either random lengths or cut to specifications in excess of 5 ft.

Plates.—The demand from local stocks shows a steady increase and Chicago jobbers are finding it a difficult matter to keep up with same. Deliveries from mills are of a belated character, these interests being similarly overwhelmed with urgent requests for shipments. In several instances, good premiums have been exacted and paid for quick deliveries.

We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼ in. and heavier, 6⅛ in. to 100 in., 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base, all full extras. Plates, 3-16 in. thick, $2 extras; gauges 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store quotations are as follows: Tank steel, ¼ in. and heavier, up to and including 72 in. wide, 2c; over 72 in. wide up to 100 in., 2.10c; over 100 in. wide, usual mill extras, 3-16 in. up to but not including 72 in. wide, 2.10c; 3-16 in., 72 in. wide, 2.35c; flange steel, 25c extra; heads, 25c extra.

Merchant Pipe.—With the opening up of the fall trade, the weakness that was so evident in the summer months shows evidences of disappearing. In the last six weeks, more or less cutting of prices has been done by the leading producers as well as by outside makers, but the former now shows a disposition to adhere firmly to its card rates, believing that the general situation does not warrant shaded prices. Despite the attitude of this interest, however, outside mills continue to quote from $2 to $6 a ton below its quotations. With this reservation, we quote official prices on random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inches	65.85	49.85	63.85	47.85
⅜ to ½ inches	69.85	57.85	67.85	55.85
¾ to 6 inches	73.85	63.85	72.35	62.35
7 to 12 inches	68.85	53.85	67.35	51.85

PLUGGED AND REAMED.

	Steel.	Iron.
1 to 4 inches	71.35	61.35	69.85	59.85

EXTRA STRONG PIPE.

⅛ to ⅜ inches	58.85	46.85	56.85	44.85
½ to 4 inches	65.85	53.85	63.85	51.85
4½ to 8 inches	61.85	49.85	59.85	47.85

DOUBLE EXTRA STRONG PIPE.

⅛ to 8 inches	54.85	43.85	52.85	41.85

Boiler Tubes.—There is no cessation in the active demand that has been in existence all summer. Local jobbers are very sanguine in their views of the future, and see nothing on the horizon to mar the pleasant prospect. Prices are without change, and we quote carload lots, Chicago delivery, as follows:

BOILER TUBES.

	Steel.	Iron.	Seamless.
1 to 1½ inches	40.35	37.35	53.00
1¼ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
		Up to 4½ inches	50.50
6 to 13 inches	52.35	37.35	

Less than carload lots from store, as follows:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches, inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Rails and Track Supplies.—While further purchases of standard sections were made for the Harriman Lines last week, there is still under consideration for these interests contracts aggregating 75,000 tons. All told, about 25,000 tons were placed in this city last week, and there are pending, about 150,000 tons from all sources. The demand for light rails is improving, local makers having advanced prices $1 a ton last week. Specifications for track supplies are exceptionally heavy, mills being unable to cope with same.

We quote heavy sections, in 500-ton lots and over, f. o. b.

mill, $28; less than 500 tons to carload lots, $30; less than carload lots, $32. Light rails are as follows: 12-lb. sections, $27; 16-lb., $26; 20 and 25-lb., $25; 30, 35, 40 and 45-lb. sections, $24, all f. o. b. Milwaukee mill. Track supplies, f. o. b. Joliet mill, angle bars, 1.40c to 1.50c; spikes, first quality, 1.75c to 1.80c; track bolts, 3¼ x ¾, with square nuts, 2.40c to 2.50c per lb., with hexagon nuts, 2.55c to 2.65c.

Merchant Steel.—Considerable new business was placed with mills last week for various agricultural shapes, the deliveries extending into the new year. Specifications are heavy and to full contract quotas.

Prices are without change and we quote carload lots, mill shipments, Chicago delivery as follows: Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c; smooth finish machinery steel, 1.91½c; smooth finished tire, 1.86c; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21½c. Cold rolled shafting, 50 percent off in carload lots and 45 percent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and upwards.

Cast Iron Pipe.—Aside from routine business, the demand for pipe is light. Prices are firm, however. We quote carload lots, Chicago delivery, as follows: 4-in. $29; 6-in. 8-in. and 10-in., $28; 12-in. and larger, $27; gas pipe. $1 a ton higher.

Wire Products.—Every evidence is presented of a big fall demand. Jobbers are contracting freely for wants ahead, taking in stock all the material that mills will ship. Prices are very strong, but without change.

We quote carload lots as follows: Wire nails, $1.95; painted barb wire, $2.10; galvanized barb wire, $2.40; smooth annealed wire, $1.80; smooth galvanized wire, $2.10; polished staples, $2.05; galvanized staples, $2.35. Less than carload lots to jobbers are 5 cents higher than above prices. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10 cents extra on less than carload lots. Bale ties are unchanged at 82½ and 5 percent to dealers on mixed car lots and 85 percent discount f. o. b. Waukegan, Ill., on straight carload lots.

Coke.—The market continues without noteworthy change. A fair demand is constantly in evidence. Prices are weak and subject to the slightest bearish influence. Connellsville furnace coke is held at $2 to $2.10 ovens, and 72-hour foundry coke, from $2.40 to $2.50 at the ovens. Wise County, (W. Va.) grades are being offered from $4.60 to $4.75 Chicago.

Old Material.—Buying by consumers continues light. Prices, however, show some advancement as the result of trading between dealers. Railroad lists are quickly bought up, the competition for same frequently resulting in some high values being established. The C. M. & St. P. has a new list out for about 2,000 tons; that of the Illinois Central for 1,500 tons which was in the market last week has been bought up. We have revised a number of our prices, and quote as follows:

Old steel rails (4 feet and over)	$14.00 to 14.50
Old steel rails (less than 4 feet)	13.50 to 14.00
Old iron rails	18.50 to 19.00
Relaying rails, subject to inspection	23.00 to 24.00
Heavy melting steel	13.00 to 13.50
Mixed country steel	11.50 to 12.00

We quote as follows net tons:

No. 1 R. R. wrought	15.00 to 15.50
No. 2 R. R. wrought	14.00 to 14.50
Shafting	15.00 to 15.50
Dealers' forge, No. 1	11.50 to 12.00
Wrought pipe and flues	11.00 to 11.50
No. 1 cast, 150 lb. and less	13.50 to 14.00
No. 1 mill	9.00 to 9.50
No. 1 Busheling	11.50 to 12.00
No. 2 Busheling	11.00 to 11.50
Country sheet	7.50 to 8.00
No. 1 boilers, cut	10.50 to 11.00
Boiler punchings	13.50 to 14.00
Iron car axles	21.50 to 22.00
Steel car axles	16.50 to 17.00
Iron axle turnings	10.75 to 11.00
Cast borings	8.00 to 8.50
Mixed borings, etc	8.00 to 8.50
Machine shop turnings	10.25 to 10.75
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.50 to 13.00
Stove plate and light cast scrap	10.50 to 11.00
Old iron splice bars	17.00 to 17.50

David Evans, 1029-1030 Monadnock Block, Chicago, agent in that territory for the Sloss & Sheffield brands of iron made by the Sloss & Sheffield Steel & Iron Co., Birmingham, Ala., has published a very neat four page brochure in which he gives the analyses of the different brands and grades of pig iron manufactured by his company. It is a useful reference memorandum.

CINCINNATI.

Furnaces Inclined to Maintain Prices, but Demand is Light.

August 16.

Pig Iron.—The week affords but little in the way of news in the pig iron market. There is but little inquiry being submitted to the sales agencies and sales are small. The quotation of $11.50, Birmingham basis, on Southern irons is heard of with more frequency, but the market cannot be said to be any easier, as the furnace interests as a rule are inclined to maintain their prices with steady uniformity. The moderate business that is going is mainly on the basis of $11.75, Birmingham basis. Strictly Birmingham irons are still held at $12.00 for No. 2 foundry. There is an abundance of the lower grades to be had for any delivery while the higher grades are not so plentiful for the third quarter and for prompt shipment. The furnace companies are urging their sales agencies to make an effort to secure orders for No. 3, No. 4, and gray forge, but not at concessions, although it is fairly well understood that on gray forge $10.25 Birmingham can be done. A few buyers are feeling the market on the last quarter and the first quarter of 1906. One inquiry has come out for 1,000 tons for delivery in the first half of next year and a quotation of $14.75 at Ohio furnace has been made and the business is still pending. In Southern Ohio $14.00 furnace is still minimum and a few of the producers are well sold up for the year. The situation appears to be one in which there can be but little interest at this time on the part of either buyers or sellers, as buyers are well covered, and furnaces have their order books in good condition and seem inclined to wait for renewed demand. Opinion in some quarters is that buying will be resumed in the fall of the year with consumers covering for the first and second quarter of 1906. There seems to be but little doubt that the wants of consumers are largely provided for through the remainder of the year, and it has been suggested that about 70 percent of the buyers can in this territory stay out of the market for the coming several months. It is thought in the trade that if the furnaces can hold the market at its present level for the next ninety days, at that time an advance can be made in prices under a resumption of buying, but it is not expected that values can be pushed to extravagant figures as the present rate of production gives promise of a sufficiency of iron for all needs. Quotations f. o. b. Cincinnati are as follows:

Southern Foundry No. 1	$14.75 to 15.25
Southern Foundry No. 2	14.25 to 14.75
Southern Foundry No. 3	13.75 to 14.25
Southern Foundry No. 4	13.50 to 14.00
Southern Foundry No. 1, soft	14.75 to 15.25
Southern Foundry No. 2, soft	14.25 to 14.75
Gray Forge	13.00 to 13.75
Northern Foundry No. 1	15.65 to 15.90
Northern Foundry No. 2	15.15 to 15.40
Northern Foundry No. 3	14.65 to 14.90
Jackson County Silvery, 8 percent	18.15
Southern Charcoal	17.75 to 18.75

Finished Material.—The demand continues good and the market is firm for all descriptions. The advanced quotations for bar iron are well maintained, and there is a slight improvement in the demand for sheets. Bar iron is quoted at 1.65c; steel bars at 1.63c. half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets at 75 and 7½ percent off. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.20c; No. 14, 2.10c; No. 12, 2.05c; No. 10, 2c. Tank plates are firm and sell out of store at 2c for ¼ in. and 2.16c for 3-16, No. 8 and No. 10. Beams and channels are quoted at 2c from stock and angles at 2c to 2.05c. for base sizes.

In merchant pipe the market is quiet and for the smaller sizes there is some irregularity in quotations, but the schedule of the leading interests has not been changed. Quotations f. o. b. Cincinnati are:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black.	Galv.	Black.	Galv.
	Percent.	Percent.	Percent.	Percent.
⅛ and ¼ inches	65.35	49.35	63.35	47.35
⅜ and ½ inches	69.35	57.25	67.35	55.35
¾ to 6 inches	73.35	63.35	75.85	61.85
7 to 12 inches	68.35	53.35	66.85	51.35

Old Material.—There is a fair trade going on in old material and the market is firm in tone with dealers holding well to asking figures. We quote:

Old No. 1 railroad wrought, net tons	$14.00 to 15.00
Cast machine and foundry, net tons	12.00 to 13.00
Old iron rails, gross tons	20.00 to 21.00
Old steel rails, gross tons	15.00 to 16.00
Old short lengths, gross tons	14.00 to 15.00
Old iron axles, net tons	20.00 to 21.00
Stove plate, net tons	9.50 to 10.00
Wrought turnings, net tons	9.00 to 10.00
Cast borings, net tons	7.50 to 8.00
Car wheels, net tons	14.00 to 14.50

Coke.—The market remains firm and although a number of foundries have covered their last half of the year requirements, there is still considerable inquiry. Prices show increased strength and some quotations are a shade higher. The following are prices quoted from the various districts f. o. b. ovens:

†Wise County, Va. Furnace Coke prompt shipment	$2.15 to $2.25 per ton
†Wise County, Va. Foundry Coke prompt shipment	2.40 to 2.50 per ton
Pocahontas Furnace Coke on contracts	1.85 to 2.00 per ton
Pocahontas Foundry Coke on contracts	2.00 to 2.25 per ton
*Connellsville Furnace Coke on contracts	1.75 to 2.00 per ton
*Connellsville Foundry Coke on contracts	2.25 to 2.50 per ton
Kanawha Furnace Coke on contracts	2.00 per ton
Kanawha Foundry Coke on contracts	2.35 to 2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices.

*Connellsville Coke inside prices apply to "main line" ovens and not to strictly Connellsville Coke.

CLEVELAND.

Demand for Bessemer From the East—Charcoal Iron Situation.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, August 16.

Iron Ore.—Heavy rains are resulting in the flooding of many open pit mines on the Mesabi and interfering with the operation of the properties to such an extent that shipments of ore are not being made as rapidly as last month and it is doubtful whether the July record of 5,224,620 tons will be equaled by August.

Pig Iron.—There is an unusual and unexpected demand for Bessemer in the East, shipments having been made from the Valley to points carrying a freight rate of nearly $3. Although the demand from other sections is not notably increased, the market is firmer, due unquestionably to some extent to the fact that the United States Steel Corporation will soon negotiate with the Bessemer Association for September delivery. The demand for price has improved and seems to be rather stronger than those for Bessemer. The usual quotation on basic, Bessemer and No. 2 foundry is $14.50, and some furnaces hold firmly for that price, but it is pretty well understood that, for prompt shipment, as low as $14.00 is being done in all these grades. The market, on the whole, is quiet, but there is no weakness except in Southern irons, on which $11.50, Birmingham, for No. 2 can be done.

Sales of charcoal pig iron for July were very satisfactory, one company booking between thirty-five and forty thousand tons. This was about equally divided between the car wheel manufacturers and the malleable manufacturers with quite a considerable tonnage to the engine and steel roll manufacturers. Sales have kept up very fairly this month, with indication that the total tonnage may reach that of July. Chicago prices are about $17.00 and Cleveland prices are $16.25 to $16.50.

Sellers of all grades are finding that a striking feature of the market is that buyers are not contracting for more than their requirements, as is evidenced by insistence upon prompt shipments of the full amount purchased. We quote f. o. b. Cleveland as follows:

Bessemer	$14.85 to 15.10
No. 1 Foundry	15.50 to 15.75
No. 2 Foundry	14.50 to 15.00
No. 3 Foundry	14.25 to 14.50
No. 2 Southern	15.50 to 15.85
Gray Forge	14.00 to 14.25
Gray Forge, Southern	14.00 to 14.25
Lake Superior charcoal	16.25 to 16.50

Finished Material.—Jobbers report an extraordinary volume of business and are having difficulty in filling orders, especially for bar iron and structural material. On the latter premiums of from $6 to $10 are being paid, counting the freight from such points as Phoenixville, Pa., from which shipments are made. The strike of structural workers has not yet had any appreciable effect on the market. Work in Cleveland has been stopped on only one building and one bridge. Bar iron is firmer at 1.55c to 1.60c at the mill. The demand for light rails continues strong and on rails less than 25 pounds the principal producers will not promise delivery before October. As some mills which are at times used to roll light rails are now rolling structural sections and will be during the remainder of the year, the capacity for light rails is much reduced. An increasing amount of business is going to rerolling mills. The demand for plates is strong, several thousand tons having been sold this week.

Old Material.—The market is strong and prices of steel boiler plate, steel axles, malleable iron, railroad, wrought, machine cast, iron axles, grate bars, pipes and flues, and tank iron. We revise quotations, Cleveland delivery, as follows:

Old iron rails	$20.50 to 21.50
Old steel rails (over 6 feet)	15.00 to 16.00
Old steel rails (under 6 feet)	15.00 to 16.00
Old car wheels	15.00 to 15.50
Steel boiler plate	11.00 to 11.50
Steel axles	17.50 to 18.50
Malleable iron (railroad)	14.50 to 15.50
Malleable iron (agricultural)	13.50 to 14.50
Heavy steel	15.00 to 15.50

We quote as follows, net tons:

No. 1 R. R. wrought	14.50 to 15.50
No. 1 busheling	12.50 to 13.50
No. 1 machine cast	13.00 to 13.50
Iron axles	20.00 to 21.00
Axle turnings	10.00 to 11.00
Wrought turnings (free from cast)	9.00 to 10.00
Grate bars	8.00 to 9.00
Pipes and flues	11.00 to 12.00
Tank iron	9.00 to 10.00
Hoop and band iron	7.00 to 8.00
Sheet iron	6.00 to 7.00
Wrought drillings	9.50 to 10.50
Stove plate	9.50 to 10.00
Cast borings	7.50 to 8.50

Plant Entirely Destroyed.—The plant of The John Simon Pipe Bending Co., of Newark, N. J., was entirely destroyed by fire Sunday evening, Aug. 13, the loss being between $100,000 and $150,000.

PHILADELPHIA.

The Market is Quiet, but the Situation is Sound and Prospects Good.

August 16.

The past week has been a rather quiet one in the trade, as was natural enough after the activity that marked the last half of July. The situation seems a perfectly healthy one, with a moderate volume of orders coming in, but many buyers still holding off to await developments a little longer. Producers, confident of a busy fall, are reluctant to take orders for the last quarter at present prices, which they think are too low. The result is a shady market, which, from the present outlook, will last until September.

Pig Iron.—There is no material change to be noted. Southern irons, of which a considerable amount was recently sold in this market, has relaxed somewhat in price, but this has had no perceptible effect on the prices of Northern irons. Some inquiries have been made as to prices for the first quarter of 1906, but furnace men are not as a rule disposed to commit themselves so far ahead. Many are hopeful that prices will work to a considerably higher level by that time. In the meantime there has been no essential change, and prices may be quoted as follows:

No. 1X Foundry	$17 25 to 17.50
No. 2X Foundry	16.25 to 16.75
No. 2 Plain	15.75 to 16.25
Standard Gray Forge	14.75 to 15.00
Ordinary Gray Forge	14.25 to 14.50
Basic	15.25 to 15.75
Low Phosphorus	20.25 to 20.75
Southern No. 2X, rail	15.50 to 16.00
Southern No. 2X, dock	15.00 to 15.50

Finished Material.—Structural material is in such demand that some mills have raised their price to 2 cents a pound. Orders continue in large volume, though perhaps there is somewhat less doing in some of the lighter lines than in the preceding weeks. The prospect is considered most satisfactory, however, in view of the orders that must soon come into the market for ship plates, bridge building material and other heavy work. Prices by schedule remain unchanged: Beams, channels and angles, according to specifications, 1.73½c to 1.90c; refined iron bars, 1.63½c to 1.80c; steel bars, 1.63½c to 1.70c; plates, 1.73½c to 1.80c.

Old Material.—Prices continue to rise in some lines, in keeping with the increasing demand from the mills, while in others they remain steady. The market is now stronger than it has been for some time. These prices are quoted:

We quote heavy sections, in 500-ton lots and over, f. o. b. mill, $28; less than 500 tons to carload lots, $30; less than carload lots, $32. Light rails are as follows: 12-lb. sections, $28; 16-lb., $27; 20 and 25-lb., $26; 30, 35 40 and 45-lb. sections, $25; all f. o. b. Milwaukee mill. Track supplies, f. o. b. Joliet mill, angle bars, 1.40c to 1.50c; spikes, first quality, 1.75c to 1.80c; track bolts, 3¼x¾, with square nuts, 2.40c to 2.50c per lb., with hexagon nuts, 2.55c to 2.65c.

Old steel rails	$16.00 to 17.00
No. 1 steel scrap	15.50 to 16.00
Old steel axles	18.50 to 19.50
Old iron axles	23.00 to 24.00
Old iron rails	19.00 to 20.00
Old car wheels	15.50 to 16.50
Choice scrap, R. R. No. 1 wrought	18.50 to 19.25
No. 1 yard scrap	16.50 to 17.00
Machinery scrap	14.50 to 15.00
Low phosphorus scrap	19.00 to 20.00
Wrought iron pipe	14.50 to 15.00
No. 1 forge fire scrap	14 25 to 14.75
No. 2 forge fire scrap, ordinary	11.00 to 11.50
Wrought turnings	12.50 to 13.00
Axle turnings, heavy	14.00 to 14.25
Cast borings	9.25 to 9.75
Stove plates	12.00 to 12.50

NEW YORK.

About 50,000 Tons of Pig Iron Sold—Heavy Rail Tonnage Inquiries Pending.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., August 16.

Pig Iron.—The market has been only moderately active during the past week, a condition due in a large measure to the fact that prices have ruled exceedingly firm. The inclination to buy has not been lacking, as the abundance of inquiries shows, but the furnaces are pretty well sold up and are unwilling to meet purchasers with even the suspicion of a shade in prices. Still the consuming demand has been very satisfactory and the aggregate business has not been small. Fully 50,000 tons changed hands during the week in the local market. Basic leads all other grades with about 28,000 tons for Eastern consumption, and more for shipment to the West. The balance is made up of scattering orders ranging from 50 to 1,000 tons each of foundry iron mostly from Northern and Virginia furnaces. Alabama has shown little or no activity, furnaces being unwilling to shade prices to secure business. Grades other than basic and foundry have been very little in evidence. Among the sales of foundry iron worthy of mention were a lot of 1,000 tons of Eastern Pennsylvania iron at $15 for No. 2 plain and one of 1,000 tons of Western Pennsylvania at $14.50 at the furnace for No. 2, and 1,200 tons of Cherry Valley, divided into two or three lots. Another call for bids for 1,000 tons of No. 1 and No. 3 foundry for the Harrison plant of the International Pump Co. has been issued to the trade, deliveries being distributed through the coming three months, and 500 tons to range from 1 to 1.50 percent silicon and an equal amount containing from 3 to 3.50 silicon. The folfowing are prices at tidewater:

Northern No. 1 Foundry	$16 50 to 16.75
No. 2 Foundry	16.00 to 16.25
No. 2 Plain	15.50 to 15.75
No. 1 Southern Foundry	16.25
No. 2 Southern Foundry	15.50 to 15.75
No. 3 Southern Foundry	15.25
No. 4 Foundry	14.50 to 14.75

Pig Iron Certificates.—Interest in pig iron certificates on the Produce Exchange was only moderate during the week. On Monday 300 tons of October regular sold between calls for $15.15. Pig iron warrants follow:

	Bid.	Asked.
August	15.00	15.50
October	15.00	15.50
November	15.00	15.50
December	15.30	15.50
February	15.50	16.00

Finished Iron and Steel.—The demand for rails and structural material continues urgent, and business in smaller shapes is gradually beginning to feel the influence of prosperity in larger lines. The event of the week in structural circles has been the awarding of the contract for the steel for the Manhattan bridge, which has been or will be formally tendered the Pennsylvania Steel Co., the lowest bidder. This contract disposes of about 43,000 tons of steel. With the exception of this contract the week has had little of interest to offer in the structural field. The expected lull has come to prepare the way for another rush in September. Rails continue to be in demand, several large tonnages for 1906 delivery being on the tapis. The large order reported last week as under consideration by the Tennessee Coal & Iron R. R. Co. is still pending, and will probably materialize in a few days. Business in steel plates has been confined to small orders for early shipment, and sheets, bars and wire products have been only moderately active. We quote prices at tidewater: Angles, 3 to 6 in. x ¼ in. and heavier, 1.74½c; beams, 3 to 15 in. 1.74½c; 1.84½c; tees, 3 x 15 in. 1.74½c;

beams, 18, 20 and 24 in. 1.84½c; tees, 3 x ¼ in. and heavier, 1.79½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine and ordinary firebox, 1.94½c; refined iron bars, 1.60c; soft steel bars, 1.64½c to 1.67c; sheets in carload lots, New York, No. 28, black, 2.40c.

Old Materials.—The demand appears to be more active than at any time for some weeks past. The inquiry covers all sorts of scrap material, but especial interest is shown in condition for charging No. 1 wrought scrap and selected yard and railroad material. Holders are not anxious to sell, anticipating a further movement in their favor. The following prices are f. o. b. approximately, at tidewater:

Old iron rails	$20.00 to 21.00
Old steel rails, long lengths	14.50 to 15.00
Old steel rails, short pieces	14.00 to 14.50
Relaying rails	22.50 to 23.00
Old car wheels	14.50 to 15.00
Old iron car axles	21.00 to 22.00
Old steel car axles	18.50 to 19.00
Heavy melting steel scrap	13.50 to 14.00
No. 1 railroad wrought scrap	17.00 to 18.00
Iron track scrap	15.00 to 16.00
Wrought pipe	11.00 to 12.00
Cast borings	8.00 to 8.50
Wrought turnings	12.25 to 12.75

BIRMINGHAM.

Scarcity of Railroad Cars—Steel Plants Working Steadily.

Birmingham, Ala., Aug. 14.—The shipment of pig iron, from the Birmingham district is only hindered by a scarcity of railroad cars and a scarcity of labor with which to load the cars. There is a steady market with quotations firm. No. 1, soft, is bringing fifty cents per ton more than the published quotations, because of the excessive sales of that product made. The lower grades of iron have been sold recently under the regular quotations, but not to any great extent. The indications for the future are still very bright and furnacemen are in splendid humor.

The following iron quotations are given: No. 1, foundry, $12.50; No. 2, foundry, $12; No. 3, foundry, $11.50; No. 4, foundry, $11; gray forge, $10.50; No. 1, soft, $12.50 to $13; No. 2, soft, $12.

The steel plants are working steadily and a very good demand is being enjoyed for the various products. President Shuler, of the Alabama Steel & Wire Co., stated that while some of the products of the Ensley plant were going to the warehouse the company would keep the mills in full operation and hold the labor, as there was going to be a demand for rods, wire and nails that would be hard to fill in the near future. Despite the fact that the cotton crops are reported short this season, the indications are that everybody will have money and much fence building will be done in the fall and through the winter.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., August 16.

Pig Tin.—The local market for the past week has been quiet and a shade easier. There was considerable inquiry from domestic consumers but London buyers did not close eagerly. It is understood that much of the tin held abroad is going into warehouses because of the high limits demanded. Today's closings follow: Spot, 32.60c to 32.80c; September, 32⅜c to 32¼c; London, £149 and £148 7s. 6d. Arrivals 1,715 tons to date, with 2,360 tons afloat.

Copper.—Prices are firmer and a shade higher. All conditions seem to be favorable to those who have or will have copper to sell, but actual trading was limited to distant future deliveries and was of only moderate tonnage. Today's Closings: Lake and electrolytic, 15⅝c to 15⅞c; casting 15¼c to 15½c. London's closings today: £69 10s. Exports for the month 7,934 tons.

Lead.—The market has been firm and a fair amount of business was transacted. Prices remain unchanged at 4.60c to 4.70c. St. Louis, 4.60c to 4.62½c; London, £13 18s 9d.

Spelter.—The demand has been good and prices rule a little higher. Today closed firm at spot, 5.70c to 5.80c; St. Louis, 5.65c to 5.70c; London, £24 10s.

Antimony.—The market is nominally unchanged with Cookson's without quotations; Hallett's, 14 to 15c, and other brands 13c to 14c.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, August 16.

Demand for old metal continues of excellent proportions. The advancing market which has ruled for the past three weeks has forced many consumers to cover, and season contracts have been numerous. Prices continue to advance, copper having been put up an ⅛c; spelter, ⅛c and sheet zinc ¼c. We quote as follows: Lake copper, 16¼c for carload lots, and 16½c for less than carload lots. Casting copper, 16⅛c for carload lots, and 16¼c for less than carload lots. Spelter, 5⅞c for carload lots, and 6¼c for lesser quantities. Sheet zinc, 7¼c for carload lots of 600-lb. casks, and 7½c for less than carload lots. Pig lead, 4.65c for 50-ton lots, 4.70c for carload lots, and 4.80c for less than carload lots. Antimony, 17c for Hallett's, and 18c for Cookson's.

Old metals show sympathy in price and demand with new metal and there is a firm market for same. Dealers' quotations are approximately as follows: Copper wire, 13¼c; heavy copper, 13c; copper bottoms, 12c; copper clips, 12¾c; red brass, 11¾c; red brass borings, 9¾c; yellow brass, 8½c; yellow brass borings, 7¾c; pipe lead, 4c. Tea lead, 3.60c. Zinc, 3¾c.

CANADIAN BOUNTY

Will Not be Paid on Steel Rails—Additions to Dominion Iron & Steel Co's. Plant.

TORONTO, CANADA, Aug. 14.—The Canadian government has passed an order in council providing that the bounty of $3 per ton on steel manufactured in Canada shall not apply to steel rails. The bounty was never originally intended to apply to rails, but under the wording of the regulation it was claimed by the Lake Superior Corporation on the rails made at the Sault, and the legal authorities sustained its view. That corporation and other manufacturers will still receive the bounty on the steel from which the rails are made.

The Dominion Iron & Steel Co., of Sydney, N. S., is about to make further extensive additions to its plant. It has been found necessary to considerably increase the output of steel in order to supply the material required to keep the blooming mill and the rod and rail mills in full operation. The company has now ten furnaces, nine of which are in operation on full time, but the quantity of steel which is turned out is inadequate. Several other open-hearth furnaces will, therefore, shortly be erected, and other important additions to the plant will be made, the details of which are now being considered.

A Berlin cable says that the governors of two Hu provinces in China, have ordered from the Kawasaki Works at Kobe, Japan, for use in the Yangtse river, six gunboats and four torpedo boats, the whole costing more than $1,500,000.

PERSONAL.

Frank H. Miller, well known as an iron manufacturer, of Columbus, O., and connected with the Columbus Iron & Steel Co., is very ill in that city and small hope is entertained for his recovery.

Alfred F. Link, formerly superintendent of the brick department of the Donora plant of the Carnegie Steel Co., has accepted a similar position with the Passaic Steel Co., at Paterson, N. J.

E. J. Caughey has been appointed works manager of the American Car & Foundry Co.'s plant at Huntington, W. Va. He was formerly manager of the Standard Steel Car Co.'s works at Butler, Pa.

The heirs of A. P. Head, who was killed in the wreck of the Twentieth Century Limited at Mentor, will receive from the Lake Shore railroad in settlement $8,000, which does not include $2,500 reimbursement for personal property lost by the victim in the wreck.

John H. Harding, who goes to Dunkirk, N. Y., as assistant foreman of the Brooks Works foundry, will be succeeded in Schenectady by Thos. J. Foley.

J. H. Adams, assistant general manager in the southern territory for the Republic Iron & Steel Co., is having a most delightful time on his European trip. He will be absent two months.

Geo. C. Forgeot has been appointed works superintendent for the Allis-Chalmers Co. Mr. Forgeot was for some years in the employ of the Edward P. Allis Co., and will now have general supervision over the plant of the Allis-Chalmers Co. His headquarters will be in Milwaukee.

Charles M. Schwab, president of the Bethlehem Steel Co., sailed on the Kaiser Wilhelm der Zweite for Europe, Aug. 15. Mr. Schwab is probably not in quest of pleasure exclusively, but that he intends to do all the things that the newspapers have laid out for him to perform, may be doubted. The most startling of the many plans attributed to him is the rebuilding of the Russian Navy with the aid of Mr. Carnegie and most of the steel plants of the country.

L. E. Thomas, formerly with the United Engineering & Foundry Co., Pittsburg, has accepted the general management of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. Mr. Thomas assumed his new duties Aug. 1. The engineering work on the new rail mill of the Republic Iron & Steel Co., Youngstown, was in his charge. Another piece of engineering work conducted by him was the construction of the Ohio plant of the Carnegie Steel Co.

H. P. North, for the last three years with Pilling & Crane, and for some years before with Poulterer & Co., will be connected after Sept. 1, with Weston Donaldson, 421 Chestnut St., Phila., in the general scrap iron business.

Charles Parsons, of Chicago, well known in the pneumatic tool business, is now associated with the Independent Pneumatic Tool Co., of that city, and will travel in the Chicago territory.

C. H. Green, formerly of C. H. Green & Co., of Syracuse, N. Y., has associated himself with the S. Obermayer Co., of Chicago, as superintendent of the department which manufactures snap flasks, floor rammers, bench and floor rammers, etc. The Obermayer Company at its Chicago plant has added a large wood working department, with special improved machinery to facilitate prompt shipments of flasks of all kinds.

C. T. Williams, of the Sheffield furnaces, has been appointed furnace manager at Bessemer for the Tennessee Coal, Iron & Railroad Co. W. C. Lavendar, of the Philadelphia furnace at Sheffield is Mr. Williams' successor at the Hattie Ensley furnace at Sheffield.

OBITUARY.

Augustus H. Taylor died at his home at 226 Monroe street, Brooklyn, N. Y., in his sixty-first year. He was the head of the electrical supply firm of Taylor & Bainbridge. His wife, a son and a daughter survive him.

Theodore Townsend, of Albany, N. Y., died Aug. 3, at Westport, where he had been enjoying a vacation. Mr. Townsend's illness was of but one week's duration and his death comes very suddenly. Educated at Albany and Poughkeepsie preparatory schools, he entered Union College, and after being graduated engaged in the iron and foundry business with Franklin and Frederick Townsend in 1846. Mr. Townsend had always been a prominent business man and leaves two daughters and a son, besides his widow.

T. T. Hillman, formerly of Nashville, Tenn., died at Atlantic City, Aug. 4. Mr. Hillman was a prominent capitalist and promoter in the iron industry of the South.

William R. Storrs, formerly general coal agent for the Delaware, Lackawanna & Western Co., died at Scranton, Pa., Aug. 9, aged eighty-one years. He had been with the Lackawanna for thirty-three years and was connected with the old New London, Willimantic & Palmer road in the early forties.

Andrew Fletcher, renowned as a steamboat engine builder, died Tuesday, Aug. 8, at his country home at Bernardsville, N. Y. The engineering profession and steamboat circles suffer a distinct loss in the death of Mr. Fletcher as he has been identified with steamboat interests all his life. In 1853 he founded the firm of Fletcher, Harrison & Co., machinists, in New York, which afterwards became the W. & A. Fletcher Co. in 1881. In 1899 the company moved to Hoboken. Among the boats built by the concern that have been especially notable are the Mary Powell in 1861, the Albany and the New York, the Priscilla and Puritan, models of speedy and high-class river steamers.

James Linehan, the well-known foundryman, died at his home No. 1664 Church street, Frenkford, Pa., of cancer of the throat. He was born in Ireland 63 years ago, came to this country when a child and learned the trade in the shops of the Baldwin Locomotive Works. He began business for himself about thirty-five years ago, being associated with Thomas Green. He is said to have taught more apprentices the molder's trade than any other man in the business, and the pall bearers at his funeral were men who profited by his instruction when boys.

Alan W. Wood, of Pittsburg, for many years secretary-treasurer of the W. Dewees Wood sheet mill at McKeesport, Pa., established by his father in 1851, died in New York, Aug. 13 as the result of an operation. After having amassed a considerable fortune, Mr. Wood retired four years ago upon the sale of his mill to the United States Steel Corporation. The deceased was 55 years old and was born in Philadelphia.

Mr. Rockwell King, president of the King & Andrews Co., of Chicago, Ill., died at Chicago, Thursday, July 27.

Francis B. Laughlin, who nearly half a century ago established furnaces in Armstrong county, Pennsylvania and later in Pittsburg, died in the latter city August 9. He was born in 1835 and died at the age of 70. For the past six years he has been retired on account of ill health. He is survived by a widow, one son and one daughter.

CANADIAN PIG IRON PRODUCTION.

First Six Months' of 1905 Shows Large Increase Over that of 1904.

The American Iron and Steel Association has received direct from the manufacturers the statistics of the production of pig iron in Canada in the first six months of 1905. The figures show a large increase, as compared with either of the two halves of 1904, as will be seen by the following table, which gives the production by fuels, in gross tons, in half-yearly periods.

Fuel used—Gross tons	First half of 1904.	Second half of 1904.	First half of 1905.
Coke	111,840	139,831	188,541
Charcoal	8,803	10,468	21,665
Total	120,643	150,299	210,206

The Canadian production of pig iron in the first half of 1905 was the greatest in any half year in the history of the Dominion, exceeding by 48,453 tons that of the last half of 1902, the next highest half year, when 161,753 tons were made. It was also greater than the production of any whole year prior to 1901. Down to that year the production of pig iron in Canada never amounted to 100,000 tons in any calendar year.

The production of Bessemer pig iron in the first half of 1905 amounted to 63,785 tons. There was no production of Bessemer pig iron in the first half of 1904, and only 26,016 tons were made in the second half of that year. The production of basic pig iron in the first half of 1905 amounted to 68,378 tons, against 28,981 tons in the first half of 1904 and 41,152 tons in the second half.

The unsold pig iron held by Canadian manufacturers on June 30, 1905, none of which was intended for their own consumption, amounted to 35,629 gross tons, as compared with 35,119 tons on December 31, 1904, and 36,868 tons on June 30, 1904. Of the unsold stocks on June 30, 1905, a little less than 6,500 tons were made with charcoal, the remainder being coke iron.

On June 30, 1905, Canada had 16 completed blast furnaces, of which eleven were in blast and five were idle. Of this total eleven were equipped to use coke and five to use charcoal. In addition three coke furnaces were partly erected on June 30, 1905. Work upon all these furnaces had, however, been suspended for some time.

During the first half of 1905 the total number of furnaces in Canada actually in blast for the whole or a part of the period was thirteen, of which eight used coke and five used charcoal. The number of furnaces that were idle during the whole period was 3, all coke furnaces.

RECEIVER ASKED FOR.

Pittsburg Broker Takes Action Against the Maryland Rail Co.

At Cumberland, Md., Monday, the Maryland Rail Co., was ordered to show cause why a receiver should not be appointed. The petition was filed by A. F. Baumgarten, a Pittsburg iron and steel broker, and a stockholder in the concern. Mr. Baumgarten alleges mismanagement in several forms, among them being the leasing of the Schonthall Iron & Steel Co.'s plant at Cumberland at what is claimed to be an excessive figure.

A reorganization is desired. The company has a large stock of material on hand and orders on its books for several months ahead. The plant has a capacity of 150 tons of light rails up to 40 lbs. per turn.

The union men formerly employed at the plant of the American Iron & Steel Co., Lebanon, Pa., are now out on a strike similar to the one just settled at Youngstown.

LARGE CAR-FERRY

Will be Built at Detroit—Orders for Freighters Placed and Pending.

J. W. Ellsworth & Co., Cleveland, acting in conjunction with the Pennsylvania Railway and the Canadian Pacific Railway, have given a contract to the Great Lakes Engineering Works, of Detroit, Mich., for a car ferry to operate between Ashtabula and Port Burwell. This combination of two leading railway lines with one of the most extensive coal shippers is likely to have far reaching effects in the coal trade. It is the intention to operate the car ferry as many months in the year as possible, ten anyhow, and if it should be proved practicable, all the year round. The car ferry will have four tracks with a capacity for the transfer of thirty 50-ton cars and will be equipped with engines capable of driving her twelves miles an hour. The car ferry will be 350 ft. over all, 56 ft. beam and 20 ft. deep from deck to keel.

It is reasonably certain, though definite announcement has not as yet been made by the ship building company, that the American Shipbuilding Co. has closed a contract with the United States Transportation Co., Syracuse, N. Y., for the construction of a freighter to be a duplicate of the E. H. Gary, recently completed for the Pittsburg Steamship Co. The new freighter will therefore be 569 ft. over all, 549 ft. keel, 56 ft. beam and 31 ft. deep.

Negotiations are under way for additional steamers, but no particulars are as yet obtainable.

PENNSYLVANIA STEEL CO.

Was the Lowest Bidder for the Manhattan Bridge Contract Awarded.

With a bid of $7,284,739 the Pennsylvania Steel Co. has been awarded the contract for the steel superstructure of the Manhattan Bridge over the East river. Bids were opened in the bridge commissioners' office, Park Row building, New York, on Aug. 10. Five bids were presented, that of the Pennsylvania being the lowest.

The other bids were: R. H. Hood Co., New York, $7,956,712; King Bridge Co., Cleveland, $9,312,940; John Peirce Co., $7,486,491.14; Milliken Brothers, New York, $7,893,970. All of the bids were accompanied by a certified check for $75,000, guaranteeing good faith.

The terms of the contract call for all of the steel construction on the new bridge, which will extend from Flatbush Avenue in Brooklyn to the Manhattan side of the river. More than 40,000 tons of steel will be used in the work. It must be completed by Jan. 1, 1909, and the contractor is required to give bonds to forfeit $1,000 a day for every day after that.

Newport Rolling Mills Out.—The Newport Rolling Mills have withdrawn from the plan for the combination of the independent rolling mills of the country. An option had been given, and it was expected that cash was to be paid for the plant. At a recent meeting in Pittsburg it was ascertained, that stock and bonds in the proposed new combination were to be given in exchange for the plants, and J. A. and A. S. Andrews, owners of the mills, withdrew from the scheme.

American Steel Foundries to Move to Chicago.—Confirmation of the reports relative to the removal of the offices of the American Steel Foundries from New York city has been obtained from President Kelley. The transfer of headquarters to Chicago will be made just as soon as suitable office space can be obtained there.

RAILROAD STOCKS

WERE THE INTERESTING FEATURE OF THE WEEK IN THE MARKET.

Continued Dividend Announcements are the Rule—Financial Notes.

Although the same strength that has influenced prices in an upward direction is still present in the market, an inclination to take profits has checked advances in quotations during the week of Aug. 7-14. As may be noted from the accompanying table, most of the stocks have closed slightly lower, the one large advance being Pullman Palace Car. This small falling off, while it coincided with a determined bear attack, was not the result of that influence, as the market has been too strong to yield. Continued dividend announcements of a favorable character have been the rule, and with the possible exception of corn the crop has been practically discounted. The European harvest and export prospects were the excuse for some fluctuation in the market, but there is little doubt but that speculation had more to do with those changes than real information. The marked advances in railroad stocks which were the feature of the week, were also in a large measure speculative, with a view to influencing the market, though a good foundation for a bullish sentiment is found in the excellent railroad reports.

In the iron and steel trade the feeling is strongly one of confidence. The increase in pig iron stocks as reported by *The Iron Trade Review*, while it had its influence, will not tend toward a curtailment of production because it is known that future demands will not result in any decreased consumption.

On the whole the market has been broader, a greater activity in investment stocks being evident. A strong undertone has prevailed with less of sensational fluctuating and the average amount of consistent trading.

	Aug. 7	Aug. 14	Changes
Allis Chalmers Co	18½	17⅜	—1⅛
Allis Chalmers preferred	61	....	....
American Car and Foundry	37⅝	37	— ⅝
American Locomotive	49¼	48⅝	— ⅞
American Locomotive preferred	111½	111½	....
American Steel Foundries	9¾	9¾	— ⅛
American Steel Foundries preferred	40	39	—1
Colorado Fuel & Iron	46¾	45¾	—1
Crucible Steel	12⅝	12⅝	— ⅛
Crucible Steel preferred	64¼	65⅛	+ ⅞
General Electric	....	184⅜	....
Pittsburg Coal Co	14¼	14⅛	— ⅛
Pittsburg Coal preferred	54⅛	54	— ⅛
Pressed Steel Car	46½	45½	—1
Pullman Palace Car	240	257	+17
Railway Steel Spring	37	36½	— ½
Sloss-Sheffield	92⅛	91	—1⅛
Tennessee Coal & Iron	90⅝	90	— ⅝
U. S. Cast Iron Pipe & Foundry Co	30⅜	31	+ ¼
U. S. Steel	36⅜	36¼	— ⅛
U. S. Steel preferred	103¾	104⅝	+ ⅞
U. S. Steel 5's	97⅝	97⅝	....
Republic Iron & Steel	22¼	21½	— ¾
American Shipbuilding	53¼	53¼	....
American Shipbuilding preferred	105¼	105¼	....
Virginia I. C. & C. Co	....	42	....
International Pump	....	28	....
International Pump preferred	....	82	....
American Can	....	11⅞	....
American Can preferred	....	69⅛	....
Bethlehem Steel	....	34½	....
Bethlehem Steel preferred	....	90½	....
Westinghouse Electric	....	170	....
Cambria Steel	....	27¾	....

The statement is made that at the next meeting of the board of directors of the Sloss-Sheffield Steel & Iron Co., the issue of common stock will be increased to $10,000,000, the full amount authorized by the stockholders some time ago. Up to this time about $7,400,000 has been issued. The additional issue, about $2,600,000, it is stated, may be divided among the stockholders as a bonus, amounting to a dividend of 33 1-3 percent.

The expectation of another dividend in United Shoe Machinery was responsible for a large advance in that stock. Under the recent change in the organization of the United Shoe Machinery Co., there is $14,000,000 authorized capital stock unissued. Earnings are increasing at such a rapid rate that this new stock will probably be issued soon. Under the plan of reorganization each holder of one share of common stock of the United Shoe Machinery Co., received in exchange 1½ shares of the common stock of the United Shoe Machinery Corporation plus 25 cents in cash. At the time of reorganization the common stock was selling at 90. The new common stock is now selling at 90. In other words, a holder of one share of stock gave up what he could have sold in the open market for $90 and now owns what he can sell in the open market for $135,—and in addition he has 25c per share in cash. His profit therefore on each share of the old stock exchanged for 1½ shares of the new is $45.25.

Chicago Pneumatic Tool Co.

The statement of profits of the Chicago Pneumatic Tool Co. for the half year ending June 30, 1905, is as follows:

Profits for the half year		$ 413,941.54
Less—Depreciation of Buildings, Plant and Machinery, including Repairs and Renewals of Buildings and Plant	$ 52,905.02	
Less—Written off for experimenting and perfecting new lines of tools	4,800.00	57,705.02
		$ 356,236.52
Less—Bond Interest for the half year	$ 57,500.00	
Less—Sinking Fund Reserve	25,000.00	82,500.00
Profit available for Dividend		$ 273,736.52
Less—Quarterly Dividend No. 9 (1 percent)	$ 61,137.83	
Less—Quarterly Dividend No. 10 (1 percent)	61,137.83	122,275.66
Balance carried to Surplus		$ 151,460.86

Surplus Account.

Surplus brought from 1904	$ 254,030.82	
Less—Appropriation on account of development work and written off	28,593.51	$ 225,437.31
Surplus for the half year ending June 30th, 1905		151,460.86
Surplus carried forward		$ 376,898.17

Financial Notes.

The St. Louis Car Wheel Co., has increased its capital from $250,000 to $750,000 and the new stock is fully paid up. The company schedules assets of $890,739 and liabilities of $130,674. J. W. Nute, president of the company, states that his corporation was not included in the street car builders' consolidation now being formed throughout the country, and that the stock increase had no significance in that connection.

The Standard Oil Co., has declared a dividend for the quarter of $6 a share, payable September 15. The previous dividends were $9 a share, payable June 15, and $15 a share, payable March 15, making $30 a share declared so far this year against $29 a share in the corresponding period last year.

The Crucible Steel Co. has been very active of late, and according to Charles H. Bean is earning $225,000 net every month, or considerably more than is required by the 7 percent preferred dividend.

The Niles-Bement-Pond Co. has declared a dividend of 3 percent on its common stock and 1½ percent on its preferred. The dividend on the common stock is payable in two installments on Sept. 20. The preferred is payable Aug. 15.

The National Lead Co. has increased its capital stock from $30,000,000 to $50,000,000. The stock is divided into

$25,000,000 seven percent accumulative preferred and $25,000,000 common. About 150,000 shares of both stocks have seen issued.

Evidence pointing to an increase in the dividend rate of the United Shoe Machinery Corporation has brought up that stock and has been responsible for several sales.

The annual meeting of the stockholders of the Allis-Chalmers Co. will be held at Jersey City, August 17. Books will be closed Aug. 17 and reopened Sept. 8.

The Ingersoll-Rand Drill Co., recently formed, is to have an authorized capitalization of $3,000,000 in 5 percent bonds, $5,000,000 in 6 percent preferred stock and $5,000,000 in common stock. The Rand Company was acquired by the new company on the basis of $41.33 in bonds, $86.08 in preferred stock and $60.75 in common for each $100 of the old company's stock. The Ingersoll-Rand Drill Co.'s preferred stock received $7.50 for each £1 share sterling; common stock received $10.00 preferred stock and $10.00 in common stock for its each £1 share. The new company will have an outstanding capitalization of $2,000,000 bonds, $4,500,000 preferred and $3,000,000 common stock.

Judge C. V. Ferguson, referee in bankruptcy, brought about a final settlement of the affairs of the Wichita Bridge & Iron Co., and the Southwestern Bridge & Iron Co., by declaring a dividend of 14 percent, making a total dividend of 34 percent.

The Northwestern Steam Boiler & Mfg. Co., Duluth, has amended its articles of incorporation, making its capital stock $200,000, and providing for cumulative dividends on the preferred stock of the company.

The Blair Co., manager of the syndicate that took over the $10,000,000 of Republic Iron & Steel bonds, reports that less than $1,000,000 worth remains unsold.

The Southern Railway Co., closely affiliated with the iron business of the South has declared the regular semi-annual dividend of 2½ percent on preferred stock, which will be payable Oct. 17, books to close Sept. 23 and reopen Oct. 18.

A special meeting of the stockholders of the American Steel Foundries is to be held Sept. 6 at 15 Exchange Place, Jersey City, to ratify the recent action of the directors relative to the financing of the company.

Convention of Railway Blacksmiths.

The National Railroad Blacksmiths' association is holding its thirteenth annual convention in Cleveland from Aug. 15 to 17. The association includes foremen blacksmiths from almost every railroad in the United States and Canada, and some in Mexico and South America. It has a membership of about 300, of which one-half are present at the meeting.

The papers to be presented are prepared by committees. The subjects and chairmen of the committees are as follows:

"Forging Machine Formers, Bulldozers, etc.," D. H. Edwards, chairman; "Spring Making, Repairing and Tempering," James Fenwick, chairman; "Oil Furnaces," John McNally, chairman; "Manipulating Tool Steel, Including High Speed Varieties," R. A. Mould, chairman; "Tools and Formers for Steam Hammers," D. Fitzgerald, chairman; "Best Material and Methods of Forging Motion Work," J. B. Anderson, chairman; "Ideal Blacksmith Shop," H. G. Price, chairman; "Best Methods of Repairing Locomotive Frames, Both Iron and Steel," W. Smith, chairman; "Best Methods of Testing Materials and Selecting Same for Uses Intended," L. J. Brunner, chairman.

The Ohio Iron & Steel Co. is building at its plant a new casting house of structural and sheet steel 180 x 100 ft., which is being erected by the Meehan Boiler & Construction Co., also of Lowellville, O.

STRUCTURAL STRIKE

Is Not Causing Much Commotion—American Bridge Co. Indifferent.

There is considerable criticism concerning the recent strike ordered by the Bridge & Structural Iron Workers' against the American Bridge Co. Sympathy seems to be largely with the bridge company, because of the reported flimsiness of the union's complaint, together with the prevalent feeling that union politics has much to do with the declaring of the strike, and the fact that some of the local organizations are not at all anxious to comply with the strike order. The bridge company seems quite indifferent to the attitude of the union, and the statement is made that the work of the company will be little affected by the strike. On the other hand the officers of the structural iron workers, while admitting that the number of men who are out is but five or six thousand, claim that considerable construction has been tied up. The international association also makes the statement that it recognizes no local agreements, despite the fact that its various branches already have understandings with the American Bridge Co.

LABOR CONDITIONS IN CLEVELAND.

At the regular quarterly meeting of the Cleveland Builders' Exchange, held Aug. 11, the labor question constituted the principal topic for discussion. Among the officers' reports was that of E. H. Towson, chairman of the executive board of the Building Trades Employers. In his report he stated that for the first time in the history of Cleveland the demands for wage increases had been successfully met by the employers on the ground that the wages had risen to as high a point as they could go without injuring the building industry.

The address of the meeting was given by W. D. Sayle, president of the Manufacturers' Association of Cleveland, and vice president of the National Metal Trades Association. The gist of his remarks bore upon the associated efforts of employers, saying that employers' associations should not be formed with the sole idea of combatting employes, but should contend against the growth of the "minority gang" influence, which grows up in every strike and does not represent the sentiment of the majority of the best element of the labor organizations. He also stated that it was necessary to arouse a public sentiment against those who from over zeal or from a desire to pose as friends of the workingman make statements unwarranted by fact or wisdom.

Continental Iron & Steel Co.

The Continental Iron & Steel Co., No. 66 Broad street, New York, dealers in scrap iron and steel, relaying rails, and railway supplies advises *The Iron Trade Review* that it intends erecting a series of buildings on the site acquired at East Rahway, N. J. The buildings will be devoted to the manufacture of a commodity entirely foreign to the iron and steel industry although a large part of the site will be devoted to the yarding of scrap iron. A previous report to the effect that this company had gone out of business, is untrue.

Increased Activity at Newburg.—The 35 in. rolling mill at the Newburg plant of the American Steel & Wire Co., started up August 16, and the blast furnace located there was again blown in after an idleness of about 12 weeks.

The No. 3 puddling mill of the Union Works of the Carnegie Steel Co., in Youngstown, O., was started up this week. Seven double furnaces will resume operations at once.

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Americans interested in the iron and steel business, visiting in Europe, will find The Iron Trade Review on sale at the office of the International News Co., Breams Buildings, Chancery Lane, London, E. C., England. Copies will be forwarded on request, from London to any address in the world.

THE STEEL CROSS-TIE.

The order placed last week by a St. Louis street railway for 1,500 of the Carnegie steel cross ties, to lay an experimental stretch of a little over a half mile of track, shows that the steel tie is making some progress. Some of the steel ties ordered by the Pennsylvania Co. last fall were not laid at the time, but have now been put into the track.

The problem of the steel tie is being studied by the steam and electric lines from the standpoint of efficiency, durability and cost of maintenance. The question of first cost has not really come up. Naturally, the price charged for these ties now, when the tonnage is limited, is quite different from the price which would be charged had the steel tie become a large tonnage proposition, as it must be if it reaches any general adoption at all.

We are in position now to make an estimate that should a steel tie on substantially the lines of the one now referred to become a regular tonnage proposition, the cost would be about $2.00 apiece. These ties run about 13 to the ton, and being laid about 2,800 to the mile, involves about 215 tons per mile. As there are over 200,000 miles of steam railroad line in the United States, operating more than 275,000 miles of track, the laying of all the existing steam railroad trackage with steel ties would involve some 60,000,000 tons of steel ties. Having regard also to the electric lines and the building of new roads, it can be seen that even the most moderate rate of replacement could easily involve a total annual tonnage running well into the millions. In such an event, one or more mills would be devoted exclusively to turning out the product. There could scarcely be a more attractive tonnage proposition. It would be much better than rails, since the section would not change, and the physical and chemical requirements for the steel would be easier.

A couple of years ago it was shown in these columns that the interest and cost of replacement of wooden and steel ties would balance in the case of a steel tie lasting 25 years and costing twice as much as a wooden tie lasting eight years. This computation considered nothing but the interest cost at 6 percent and the sinking fund necessary to buy the new ties. With a prospective cost of $2.00 for a steel tie, and the cost of wooden ties rapidly working up to $1.00 in some sections, the case appears pretty favorable to the steel tie. It may develop great disadvantages, but the following points are in its favor: (1) the expense of relaying would be involved less frequently; (2) at the end of its life as a tie it would have a scrap value which might not be far from half its original cost.

The steel tie is being found advantageous in the special case of intricate switching installations. Probably the time will come when the frog and switch concerns will add the furnishing of the steel ties in their work.

INCREASED BASIC PIG PRODUCTION.

While the production of pig iron in the first half of this year was at a rate about 25 percent greater than the production in either 1902 or 1903, during which a rate of about 18,000,000 tons per year was maintained, the production of basic pig in the first half of this year was almost as great as it was in either of those years. The figures are as follows:

	Pig Production, Total.	Gross Tons, Basic.
Year 1902	17,821,307	2,038,590
Year 1903	18,009,252	2,040,726
Half year, 1905...	11,163,175	1,966,592

The increased production of basic pig in the first half of 1905 was partly at the expense of Bessemer pig, but chiefly at the expense of other grades. In fact, there is indicated a general increase in the proportion of steel making pig, of which basic reaps the main benefit. Thus, in percentages, the production of these grades of pig iron compare as follows:

	Year 1902. Percent.	Year 1903. Percent.	Half-year, 1905. Percent.
Basic pig	11.3	11.4	17.6
Bessemer pig ..	55.5	58.3	53.8
Other grades ...	33.2	30.3	28.6
	100.0	100.0	100.0

Part of this increase is due to the natural failure of the supply of scrap to keep pace with the increased demand, but part is due also to the increased demand

for steel as compared with wrought iron and cast iron. The whole iron and steel industry has been growing rapidly, and if there were no influence but that of scrap, then the production of other grades of pig iron than basic and Bessemer would have been increased in some measurably similar ratio, since a failure in the scrap supply would force iron mills and foundries also to use a greater proportion of pig and a lesser proportion of scrap.

THE HEAVY EXPORT MOVEMENT.

The statistics of iron and steel exports as presented in our news columns from month to month show that a remarkably heavy movement is now probably on the wane. In each of the first four months of this year the exports were larger, in tonnage, than in the corresponding month a year earlier, while the May and June exports fell short of those in the same months of 1904. Accordingly, the twelve month period of heaviest exports would be the period from May, 1904, to April, 1905, inclusive. The monthly totals of tonnage exports are presented in the table below, the figures including pig iron, scrap, billets, rails, and various finished products including nails and wire. They were subject to revision, as originally presented by the government, but are substantially accurate.

Iron and Steel Exports, Gross Tons.

	1902.	1903.	1904.	1905.
January	40,373	15,048	49,880	56,898
February	32,551	21,727	57,546	70,423
March	35,833	26,627	89,332	89,878
April	33,703	32,593	75,414	102,645
May	38,889	24,751	107,627	74,072
June	34,385	26,311	119,178	71,490
July	28,971	26,983	108,039	
August	30,646	20,870	101,122	
September	21,672	23,886	131,884	
October	28,207	33,445	128,663	
November	22,261	30,362	121,705	
December	22,023	42,259	74,761	
Corrected totals	372,398	326,655	1,167,678	465,406

As the exports in the first half of this year fell some 33,000 tons short of the exports in the first half of 1904, the exports for the fiscal year ended with June last were not as heavy as for the calendar year 1904. The exports in the twelve-month period ending with May, 1905, however, were about 1,215,000 gross tons, and constituted the heaviest movement in any consecutive twelve months in the history of the American iron trade.

The indications are that exports will continue for a while at something like the decreased rate shown by the May and June figures. There is more demand for material at home, and less disposition to "dump" the product of surplus capacity.

The rolling up of a large tonnage in iron and steel exports does not necessarily indicate a profitable export business. Too often it has been merely a surplus which has been dumped, at unsatisfactory prices, and the material has represented the lowest forms of production. There has, however, been a very satisfactory progress, for years, in the direction of our exporting more finished iron and steel products. Thus, our heaviest pig iron exports were in the calendar year 1897, when the total of pig iron and ferro-manganese was 262,686 gross tons; in 1904, with total exports much larger than in 1897, the exports of pig iron amounted to only 49,025 gross tons. It is true that the advance so far has not been very great, since while in 1897 our exports of crude steel, billets, etc., were almost negligible, our exports of crude steel in 1904 were 314,324 gross tons. Still, it is a measurable advance from Southern pig iron to Northern steel.

There are more important advances in store. In some of the really finished steel products, such as plates, wire, and merchant pipe, a satisfactory export trade has been built up.

The line which has lagged most behind in our export trade has been the sheet products, including black and galvanized sheets and tin and terne plates. The reason for this is obvious. While in all other steel rolling operations machinery and methods have been wonderfully improved, in the rolling of sheet steel products old methods are followed, the operations being cumbrous and expensive, through involving so much hand labor. Naturally the United States has been at a disadvantage, with its much higher tonnage wage cost. There is now better promise in this direction. For nearly two years a semi-continuous mill has been in operation in Pittsburg in the production of black plates for tinning, and lately a somewhat similar mill, for the production of sheets, has been put in operation at South Sharon. The limit of output has this summer been entirely removed in the union sheet and tin mills which operate on the old style, and improvement bids fair to be more rapid than it has been in the past. The demand already exists and the trade can be entered upon by the United States when the price can be made right. Thus, in the first six months of this year the exports of Great Britain of sheet steel products have been as follows: galvanized and corrugated sheets, 198,987 gross tons; black plates for tinning, 31,435 tons; tin plates and tinned sheets, 186,109 tons; total, 416,531 gross tons.

THE RECIPROCITY CONFERENCE.

The attention of the iron and steel producers and the machine manufacturers of the country is centered this week upon the deliberations of the National Reciprocity Conference in session at Chicago. While the initiative in calling this convention was taken by an agricultural association, the project won such speedy and widespread indorsement by manufacturing and commercial bodies throughout the country that iron, steel and machine-producing interests found themselves specifically involved in addition to their usual concern in any movement calculated to improve the national industrial welfare.

Full of significance is the fact that the conference,

having as its avowed object the securing of tariff concessions to foreign countries, originated with the National Live Stock association, a western body which in times past has been both a consistent and insistent exponent of a high protective tariff, as illustrated by its successful efforts toward securing heavy duties on imported wool and hides. Its change of attitude is justified on the ground that "one by one the European governments are tightening the coils intended to strangle the American export trade." That it is not alone in this view is shown by the indorsement of the call and the sending of delegates by powerful commercial and manufacturing bodies east and west among them being the Illinois Manufacturers' association and the National Association of Agricultural Implement and Vehicle Manufacturers.

Both exporters and economic experts are agreed that our foreign trade is just now facing the most menacing situation in its history. The wonderful strides made of late by American products in finding profitable European markets have brought about retaliatory tariff legislation which, with specially reduced duties to more favored countries, has placed constantly greater obstacles in the way of our producers. Germany, which now receives annually more than $200,000,000 of our exports, is soon to put into effect against us tariff increases as high as 100 percent, at the same time still further discriminating in favor of certain of our rivals, and almost every other European nation has already provided a similar bar to American goods or is threatening such action.

Europe is our greatest customer. Among our important exports which must suffer are machinery of various kinds, machine tools, agricultural implements and other tools, railway and street cars, motor cars and bicycles and electric lighting and power apparatus. The iron and steel industry is directly interested in these lines, but it is also vitally concerned in the general prosperity of the country and must join in any movement toward its improvement. The wide farming sections of the west and middle-west this year are yielding an immense harvest which must find a market larger than home-consumption can supply. Yet agricultural products form one of the lines on which Germany, at present a heavy customer, plans to place a tariff practically prohibitive. Low-priced wheat means an industrial stagnation from the effects of which the iron and steel trades can hardly hope to escape.

The demand for the establishment of fairer trade relations is not new. It was the text of President McKinley's final address, and at the last session of congress President Roosevelt strongly urged some action leading to tariff revision along reciprocity lines, but in this he was systematically blocked by a small coterie of "stand-pat" senators. These and other efforts at reform, however, partook somewhat of the nature of a political movement. In contrast, they are now taking the form of a strictly business enterprise. An association of business men—producers and exporters,—called the meeting, representative men of ability were chosen delegates and the conference began with the understanding that it was to take up a complicated industrial problem and determine upon the wisest course for the nation's business interests, and therefore for the nation. This is as it should be. On the American producer depends the prosperity or failure of the country; he should be able to state what the ideal tariff conditions are and to suggest the legislation necessary to secure them. As an industry vitally interested, the iron and steel trade will await the recommendations of the convention and plans for the furtherance of the campaign there originated.

Plain Case of Graft.

The *Wall Street Journal* says: "In plain language, speculation by directors in the stock of their corporations is a practice almost universally followed at the present day. It will be argued that if directors or corporations are going to be chosen from among the able financiers of the present day who are themselves connected with Wall street firms in touch with the stock market, things can hardly be otherwise, but that does not alter the fact that the thing is wrong. It will be argued that directors must be chosen from the members of the "high finance" and that the support of this group is absolutely necessary to the success of large corporations. But that does not give these gentlemen the right to use directorships for their personal profit, or the personal profit of their partners. A great change is needed and badly needed in this matter. A very large proportion of the speculation in securities is being carried on to-day by people who are morally incompetent to do so, because of trust relations with others. That is all there is about it. It is plain "graft" and nothing else, and no amount of usage will ever make it right."

Like Fairy Tales But—

The London Iron and Coal Trades Review says:

"Nothing in the whole history of manufacturing industry is so constantly and so phenomenally fruitful of surprises as the developments which take place, and are very generally threatened, in the American iron and steel industries. Properly interpreted, the annual reports of the American Iron and Steel Association have a considerable affinity with fairy tales in all the usual elements of sensation and surprise, except their unquestioned veracity. Nothing in the travels of 'Baron Munchausen,' wide as they were of the region of fact, is more likely to appeal to the human sense of wonder than the development of the American steel industry. Nothing in the 'Arabian Nights' is more like the fabled exchange by Aladdin of old lamps for new than the rise and the experience of the United States Steel Corporation. The princess and the genii of romance can not parallel the extraordinary rise of the iron and steel kings on the other side of the Atlantic, some of whom, not so many years ago, unable to get a bare living, now think and act in millions and sit down on terms of equality with the proudest aristocracy on earth. The American iron magnate, as has been said by the greatest among them, is usually either a prince or a pauper. He is clothed in purple and fine linen, and faring sumptuously every day with Dives, or he is sitting at the gate with Lazarus."

Blast Furnace Gas Blowers.

BY DR. ALFRED GRADENWITZ.

Gas engines which are at present finding an ever-increasing scope in every industrial field are used to advantage also for the operation of blast-furnace blowers. For this special purpose, gas engines should be direct connected, and the speed higher than usual. The Nuremberg Machine Works, of Nuremberg, Germany, have developed a special type of gas-driven blowers with a view to the requirements of metallurgical operations, a few examples of which are reproduced in the accompanying illustrations.

A schematical view of the arrangement is given in Fig. 1. The blower cylinders are arranged concentric with the gas cylinder in front. They are connected by an intermediary piece fitted with guides. This intermediary piece has an opening of sufficient magnitude to allow of the back cover of the gas cylinder and also of the blower cylinder being removed, being so designed as to insure a ready access to the interior of the cylinders. The back guides are connected concentrically behind.

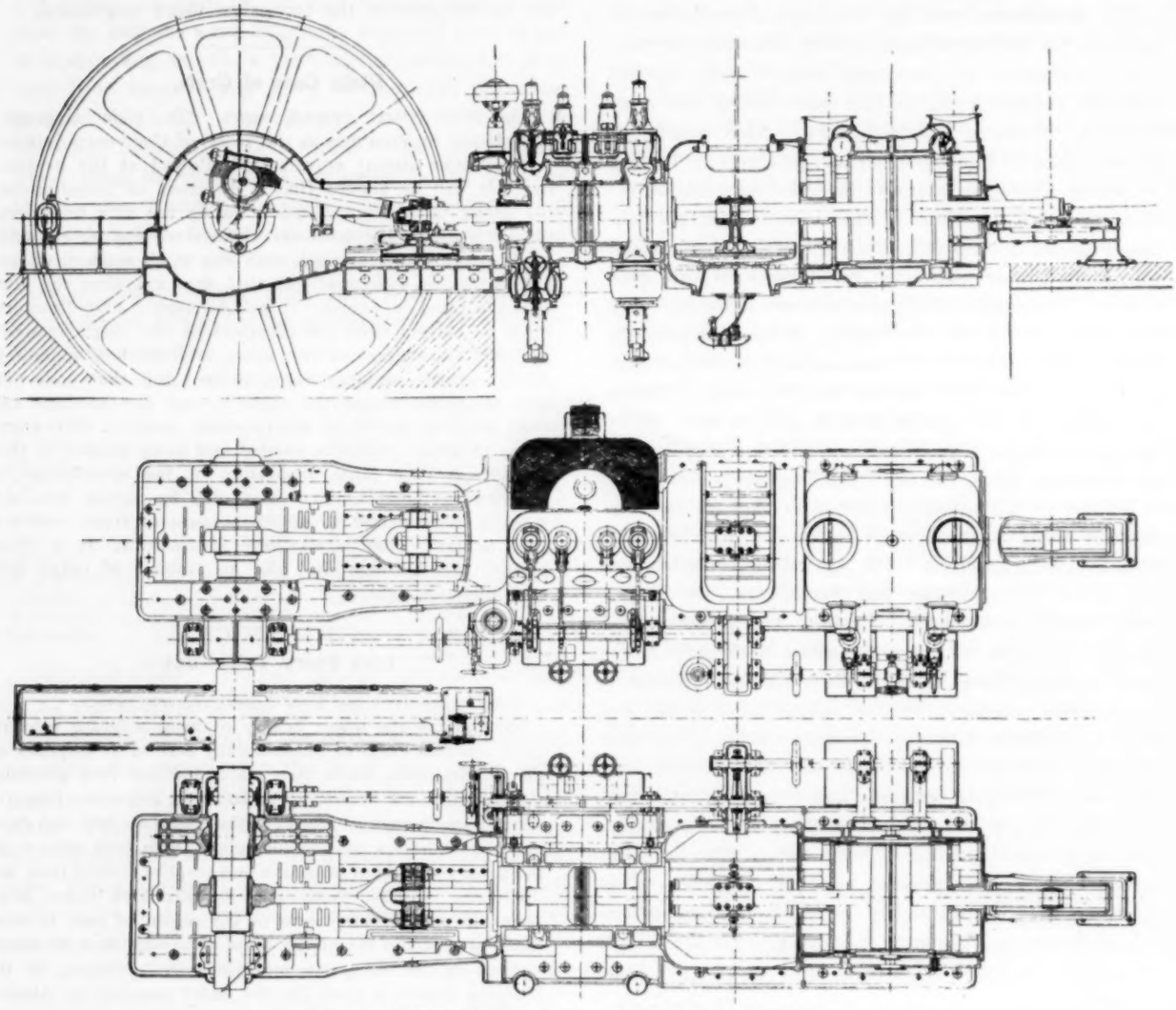


FIG. 1.—ARRANGEMENT OF BLAST FURNACE GAS BLOWERS.

The driving gear is designed similar to that of gas engines, a hollow piston being fitted to hollow piston rods, which if desired may be cooled by water jackets. The weight of the pistons and piston rods is compensated by external guides. Cast iron rings behind which springs have been arranged are used to make the piston gas tight. In the event of the blower being assembled with a tandem gas engine, the piston rod coupling is made so long as to enable the piston rod of the rear gas cylinder to be shifted as far as the intermediary piece, thus allowing a ready inspection, cleaning or exchange of the piston rings. The stuffing box of the blower cylinder is fitted with cast iron rings, which are tightened automatically in the interior, similar to those of the gas cylinders.

As in the case of gas engines, ease of access and of assembling has been made a special point. In order to allow the wind ouput to be reduced, the number of revolutions of the engine can be regulated at will, and can be decreased by 50 percent. As the mass of the flywheel is rather considerable, the engines run smoothly and safely even at small speeds.

The blower cylinders are fitted with suction governors in the shape of rotary slides. In the case of greatly varying wind pressures, these governors can be adjusted during operation with a view to insuring a constant

blower output, in such a way that with about a constant point of opening of the valves the closure of the latter is delayed beyond the dead point, so that part of the drawn-in air can be thrown out again.

Compression is obtained by a combination of a guided cock, with an automatic reaction valve, which design has given most satisfactory results, especially in the construction of compressors, where it is used largely.

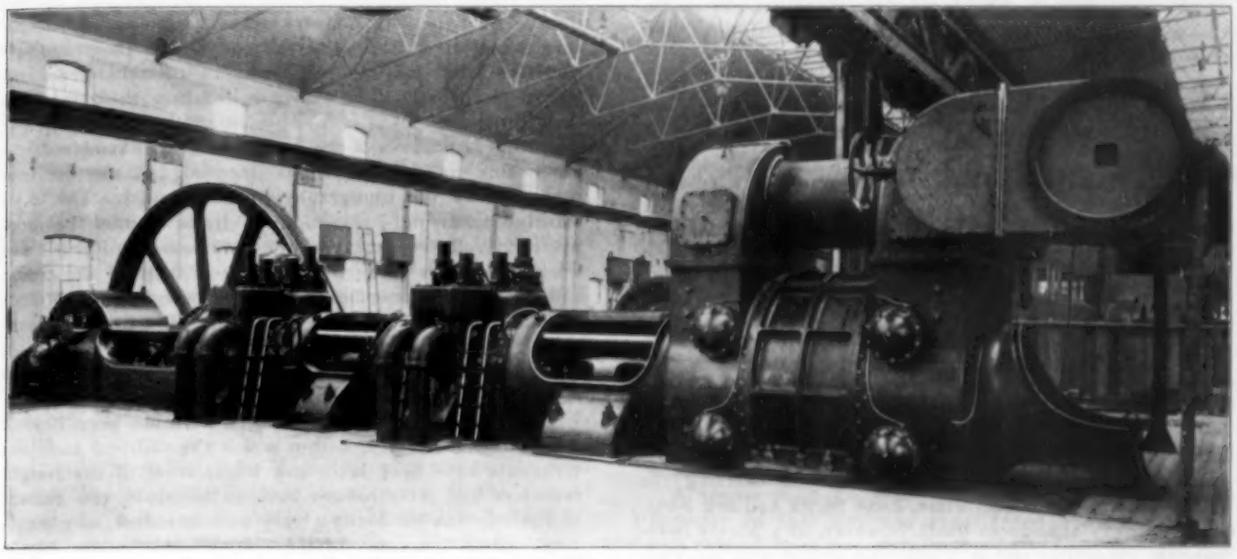


FIG 2.—GAS BLOWERS OF 950 HORSEPOWER, IN ROMBACH METALLURGICAL WORKS, ROMBACH, GERMANY.

This guided compression cock which is designed like the suction cock, is locked at the dead point after the compression stage is completed, remaining in the locked position for more than a complete stroke of the engine. During this time the reaction valves above the pressure valve, which so far has remained open, are allowed to lock the compression chamber in virtue of their small weight and in conjunction with a slightly tightened spring. During the ensuing compression stroke the pressure cocks are opened. As soon as the pressure existing in the wind pipe has been attained, the pressure valve will be opened in turn, and at the following dead point the pressure cock is locked, after which the whole series of operations is repeated.

Owing to the mechanism of this governor the valves used are relatively few in number and very simple in construction, their cross section and stroke being rather great.

In one installation two blast furnace blowers of 1,600 h. p. each and 25 to 80 r. p. m. are in operation, each compressing 1,000 cubic meters of air to 0.5 atmosphere per minute and to 1 atmosphere in the case of reduced wind output. This blower is operated by blast furnace gas.

The four gas blowers represented in Figs. 2 and 3 have each an output of 950 h. p., running 80 r. p. m. and compressing 860 cubic meters of air per minute to 0.5 atmosphere or to 1 atmosphere in the case of a reduced air supply. These blowers, which are operated by blast furnace gas like the above, are installed in the Rombach Metallurgical Works at Rombach, Lorraine.

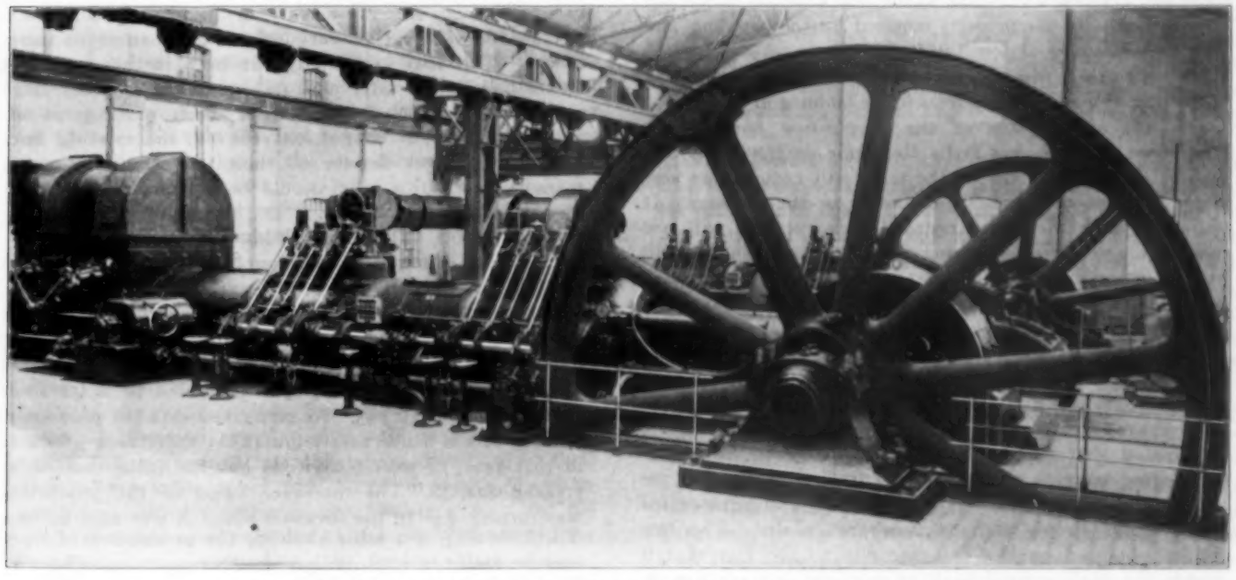


FIG. 3.—GAS BLOWERS OF 950 HORSEPOWER, IN ROMBACH METALLURGICAL WORKS, ROMBACH, GERMANY.

BELT LINE IN CLEVELAND.

Will Connect Important Steel and Iron Producing Districts.

Continued perseverance through a number of years in the face of financial and engineering difficulties, has finally found a solution which will give Cleveland a belt line in the near future. The rapid growth of freight traffic through Cleveland and the congested condition of the existing facilities resulting from that expansion, not to say anything of the inefficient arrangement of the local switching trackage, has long since made a belt line an eminently desirable addition to the railroad facilities of that city.

The company which has finally developed a feasible plan has been incorporated as the Cleveland Short Line Railway Co. Its chief promoters are: W. R. Hopkins, M. A. Fanning, Ben F. Hopkins, J. G. W. Cowles and Senator Charles Dick. These men are prominently connected with the business affairs of Cleveland, and none have realized more than they the advantages that would accrue from the new line. Interesting H. M. Hanna, who has been chiefly influential in financing the proposition, the new incorporation has obtained backing from both local and New York capital, thus overcoming one difficulty long experienced by rival promoters. Traffic arrangements have been made with all lines entering the city, including the Nickel Plate, Lake Shore and Big Four. The company announces itself, however, as a purely independent enterprise and it is officially stated that no Vanberbilt money is invested in the enterprise.

The line will run from Fairport on the east to Lorain on the west of the city, circuiting about the heart of the city through the Newburg steel district and the stockyards section, near South Brooklyn and Linndale.

The choice of route evidences how closely the promoters have catered to tonnage producing sections.

An ordinance has been obtained from the city council of Cleveland granting a franchise to the new company which has already purchased the property required for the new line, and with the exception of some slight opposition on the part of suburban property owners, there seems to be nothing standing in the way of immediate progress in the building of the road.

The engineering side of the proposition has already cost some $100,000, but is by this time well worked out. The actual construction of the road will require the services of some of the best engineers in the country. It will rank with the finest railroad construction; will not have a single grade crossing on its entire length, will have a maximum grade of sixteen feet to the mile, made possible by numerous cuts and fills, and will have one of the largest steel bridges over the Cuyahoga river, near the Schaaf road, that has ever been built for railroad purposes.

All the bridges and culverts, and the right of way will be prepared for double track the entire length. It is anticipated that the business of the line will be immediately so heavy as to require two tracks. There will be arrangements made in the building of the structures for more tracks to be built as they are needed. The low grades obtained on the belt are due to the fact that it avoids the high ground back of the city and reaches its highest point in the forty-foot cut under the Erie railroad at Newburg.

For its bridge structures the line will require more than 18,000 tons of steel and more than 100,000 cubic yards of masonry. The cuts and fills will require more than 5,000,000 yards of earth. There are very favorable manufacturing sites along the route of the new road.

The congestion existing at present is chiefly due to the narrow limits permitted by nature for freight terminals and transfers on the lake front and in the Cuyahoga valley.

These low level areas have been utilized to the utmost. On the lake front and in the valley, at the very heart of the industrial and maritime life of Cleveland, there exists a congested area into which nearly all the railroads and water traffic must come; where the greater part of the freight cars for city delivery must be unloaded; where cars transferred from one railroad to another, and all transfers from lake to rail, must be interchanged; and where six of the eight railroads entering the city have their terminals.

Further expansion of the congested area is rendered impracticable by the limitations imposed and the barriers presented by the topography of the locality. The constantly increasing congestion of traffic cannot be permanently relieved except by the development of new lines which will serve to keep a large proportion of the traffic entirely out of the congested area escaping swing bridges over the river and grade crossings within the city, diverting through freight to a route almost entirely outside of the city, and developing new and ample areas for freight interchanges and industrial development.

While the industries of Cleveland have not been limited to the low level area, within which the railroad and lake terminals have been kept, and where most of the freight transfers and interchanges have to be made, the growth of the city has produced a very serious industrial congestion. Great increases in land values have made expansion very costly. Marked increases in tax valuations and tax rates have materially increased the fixed expenses directly chargeable to location. At the same time, the freight congestion from which the railroads are suffering has inevitably resulted in poor switching service, which, in turn, has necessitated increased room for storage tracks and storage rooms, earlier delivery of output, and a longer anticipation of supplies.

These conditions have not only resulted in seriously hampering the manufacturers, but have, in many cases, caused the removal of very valuable industries to other points. This loss to the city has been further increased by its inability to offer advantageous sites to many large industries to which it could offer many other great advantages. Freight congestion relieved, the existing lines could give better service to their factories. For many manufacturers, this relief would be sufficient.

Fluorspar Production.

While the demand for fluorspar has increased greatly in the last two years as a result of its use in foundry work, Illinois and Kentucky continue to be the chief sources of supply. As is well known fluorspar is used in glass making and in foundry operations because of its silica. In 1904 the production of fluorspar amounted to 36,452 short tons, valued at $234,755. As compared with the production of 1903 this is a decrease from 42,523 short tons produced in that year, of over 6,000 tons but the value thereof increased $21,138. The increased value of the production was largely due to the form in which it was sold in 1904. The following is a table showing the production of fluorspar by states in 1902, 1903, and 1904:

State.	1902.		1903.		1904.	
	Quantity. *Short tons.*	Value.	Quantity. *Short tons.*	Value.	Quantity. *Short tons.*	Value.
Arizona and Tennessee..	628	$6,872	275	$2,037	151	$1,084
Kentucky	29,030	143,410	30,835	153,960	19,096	111,499
Illinois	18,360	121,532	11,413	57,620	17,205	122,172
Total	48,018	271,814	42,523	213,617	36,452	234,755

Though the production in 1904 has plainly fallen off considerably from that of 1902 and 1903, it was still much greater than the production previous to the last few years.

BRITISH NEWS NOTES.

The Low Moor Co., Ltd., York, England, is erecting a new furnace at its Low Moor Iron Works, Bradford.

The North Lonsdale Iron & Steel Co., Ltd., is having two furnaces at its North Lonsdale Iron Works, Ulverston, Lanc., relined.

The directors of Fawcett, Preston & Co., Ltd., Phoenix Foundry, Liverpool, announce that the reconstruction of the company has been completed.

Escaut Foundries & Extensions, Ltd., has been registered with a capital of £80,000. The office is located at 16 Mark Lane, London, E. C.

The works of the Sheepbridge Coal & Iron Co., Ltd., will be visited by the members of the Iron & Steel Institute on Sept. 26.

According to Dr. Ludwig Mond at a meeting of the Mond Nickel Co., recently held in London, the government has decided to use nickel steel for heavy guns, and tne admiralty have, after a series of successful tests, adopted nickel steel for battleship armor plates.

J. Gray Buchanan, of William Jacks & Co., iron, steel and metal merchants, of 49 Leadenhall street, London, E. C., has accepted a seat on the board of the New Expanded Metal Co., Ltd., York Mansions, Westminster, S. W.

Councillor Alfred John Reynolds, who will be the next Lord Mayor of Birmingham, is a native of the city of Newtown Row and the eldest son of the late John Reynolds, who established the Crown Nail Works there.

The Sheepbridge Coal & Iron Co., Ltd., Chesterfield, Derby, England, has just received a large order for 24 in. pipes for the Manchester Corporation. The company is also at work upon a large order recently secured for 20 in. to 30 in. pipes for the Derwent Valley Water Board.

Penny & Co., Ltd., of Lincoln, Lincolnshire, makers of steel castings by the Johnson-Frier process, are about to enlarge their foundry so as to meet a wider range of requirement. They have been particularly successful with parts of traction engines and steam-winch work, such as gear, connecting-rods, pinions, pistons and cranks.

An exclusive license has been granted to the Sheffield Steel Makers, Ltd., by the Societe Electro-Metallurgique Francaise to work the Heroult electric steel smelting process. It is stated that the firm is making arrangements for erecting special works for the manufacture of steel under the Heroult patents.

Thwaites Bros., Ltd., of Bradford, England, have obtained the contract for the supply of 17 steam hammers, varying in size from three tons to five cwt., for the equipment of the new works of the Metropolitan Amalgamated Railway Carriage & Wagon Co., Ltd., of Birmingham. This firm has also in hand important orders of the same kind for the Imperial Japanese government.

The "Simplex" Steel Conduit Co., Ltd., of Garrison Lane, Birmingham, and 20 Bucklesbury, E. C., has prepared selections of samples in a cabinet for loaning to station engineers, architects and others interested in their work. Each cabinet has four trays, in which the samples are classified in main groups. When spread out the whole gives an excellent idea of the completeness of the conduit system.

Thomas Turner & Co., Ltd., Wolverhampton, Staffs, have been registered to acquire and carry on the business of manufacturers of locks, safes, automatic machines and general specialties in metal and wood. The capital is £14,000, and the first directors are: J. S. Dumbell, J. B. Dumbell and T. A. Dumbell. The registered office is Phoenix Works, Great Brickkiln street, Wolverhampton, Staffs.

The Saxton Engineering Co., Ltd., has been registered to carry on the business of mechanical engineers, founders, machinists, toolmakers, fitters, millwrights, etc. The first directors are: E. T. Bousfield, E. G. P. Bousfield, H. F. Blackman and W. Dutton. The registered office is Fenton, near Stoke-on-Trent. The capital is £5,000.

Whitley & Valiant, Ltd., has been registered to acquire the business of hinge and lock manufacturers carried on by J. H. A. Whitley and W. Valiant at Ashton-in-Makerfield, Lanc., as John Whitley & Co. The first directors are: J. H. A. Whitley, W. Valiant, and J. Valiant. The capital is £12,500.

Yates & Thom, Ltd., with a capital of £240,000 has been registered to carry on the business of iron founders, boilermakers, mechanical and electrical engineers, machine and tool makers, brass founders, smelters, coppersmiths, etc. The first directors are: W. Yates, W. Thom, W. Thom Jr., H. Thom and F. Thom. The registered office is the Canal Engineering Works, Blackburn, Lanc.

Cross Bros., Ltd., has been organized with a capital of £60,000 to acquire the business of ironmongers, iron merchants, furnishers and general dealers carried on at 3-4 St. Mary street and 21-23 Working street, Cardiff, Glamorgan. The business of metal-founders, boilermakers, agricultural implement manufacturers and merchants, gunsmiths dealers in chains, anchors, and shipping appliances will also be carried on. The first directors are: C. Cross, E. E. Cross and T. N. Cross.

A report from Leeds, York, states that the motor-car industry of that city has experienced a great stimulus, and that at least two new houses have been brought into the field in consequence. A good number of .cars are being regularly turned out, adapted for various purposes, some to take carriage loads up to five tons, others as tipping carts, parcel vans, and for road-watering and dust-collecting. Some 300 motors have been registered by the Leeds Corporation.

Joseph Jonas, Lord Mayor of Sheffield and a director of Jonas & Colver, Ltd., of the Continental Steel Works in that city, has been knighted in connection with the royal visit to Sheffield. Mr. Jonas was born at Bingen-on-the-Rhine in 1845, and 25 years ago commenced business in Sheffield as a steel manufacturer. Two years later he was joined by Robert Colver, some time after which he and his partner acquired the business of Colver Bros.

The directors of the Rhymney Iron Co., Ltd., state that the balance of undivided profit brought forward for the year ended April 1 last, was £2,618. The profit for the past year was £39,090, making a total of £41,708. Interest on debentures absorbed, £16,450, leaving a balance of undivided profit of £25,258. The directors recommend a dividend of 2 percent, and that £4,000, the amount paid in December for drawn bonds, should again be carried to the debenture redemption fund, leaving £21,258 to be carried forward.

News from Newcastle-on-Tyne, Northumberland, England, states that the engineering and shipbuilding industry on the northeast coast is still indifferent. In some of the Tyneside yards there is a good deal of work, but from others the report is for the most part moderate. In the Tees district the returns of the South Durham Steel & Iron Co., show better. Three mills are running, producing over 7,000 tons of iron and steel weekly. The Moor Mills at Stockton, which have been closed for many years, were restarted as a result of the demand for ship plates and angles at the beginning of the year. Boclkow, Vaughan & Co.'s Eston Plate Works, after having been closed for two and a half years, have recently been reopened, giving evidence that the demand for shipbuilding material has improved.

FOUNDRY PRACTICE.*

BY DR. RICHARD MOLDENKE.

We deal here with an industry producing over 4,000,000 tons of finished product per annum, and which is daily expanding. There are some 6,700 names of foundries and shops of other persuasions which own a foundry, in the United States and Canada. The benefit that scientific thought and investigation has given the foundry, is but a generation old, and surprising indeed is the progress that has been made. With all this progress, however, the men of scientific attainment, and more than this, with additional common sense of every day practical life, are few and far between, and when one is wanted badly, he must either be made from among a collection of iron chemists, or else taken away from another place by a better offer. Very limited indeed has been the attention given to this important industry by our institutions of learning.

The laboratories in foundries are still few and far between. Only the large works possess them, and have good men to get results. The smaller foundries plod along cheerfully without troubling their heads much about the chemistry of iron, but whenever they lose an important casting through bad iron, they charge the next man so much more for his work. Or else they blame the furnace and try to get a rebate on the pig iron used. As this kind of thing cannot last, arrangements are now being made to protect the large as well as the small man, by means of standard specifications, so that he who really wants to be on the right side for right's sake, can do so without going to elaborate and expensive arrangements at his works. The commercial laboratories can then see that the specifications are lived up to, and the chances for failure are greatly diminished.

Taking conditions as we find them to-day, a young graduate will be told to fix up a laboratory and at once get results for his employer. That is to say, if he can obviate the constantly recurring losses by reason of the iron running "off," the percentage of good castings made in that shop will average two to three percent more than was formerly the case.

To enable such a production of uniformly good castings to be made, the materials must necessarily be uniform in the first place, and the pig iron, coke, and other supplies which come in regularly should be investigated. Unless one knows just what is happening in the melting process used, he will not be able to make his mixtures properly. It is better, therefore, while analyzing the material coming in, to study the composition of the castings made which have turned out to be first class. Now by calculating the charges which have gone into the cupola or furnace, and comparing with the good castings made, the melting loss and changes are easily ascertained. Thus, in a comparatively short time, the melting factor for cupola or furnace in that particular shop will have been determined, the necessary mixtures made, and attention can be given to desirable changes for still further improving the quality of the output.

To particularize, if, for instance, the analysis of a series of good boiler castings shows that they should contain about 1.90 percent silicon, not over 0.05 percent sulphur, and not over 0.40 percent phosphorus, the carbon and the manganese being those of normal irons, then the mixture must contain the silicon wanted, plus that burned out during the melting (about 0.25 percent). The sulphur of the mixture must be at least 0.01 percent lower, as this amount is always added by the unavoidable contact with the fuel. The phosphorus need be but slightly lower, as the melting acts somewhat in the way of concentration, the bulk of the heat becoming four to seven percent smaller. This percentage, by the way, is called the melting loss.

In the calculation of mixtures, we have the following elements to deal with: pig iron, scrap of various kinds, the fuel, and limestone as the flux. The pig iron may be either cast in the furnace sand bed, or else in chill molds, as arranged for in the furnace casting machine. Again, the pig iron may be either charcoal, coke or anthracite metal; that is, produced with these materials as fuel. A further differentiation gives us cold blast and warm blast charcoal pig irons, the order of excellence being from the finest cold-blast charcoal irons down to the poorest cinder-made hot blast coke irons. The mixture to be made may contain only one variety of pig iron, or else can be built up mysteriously out of twenty-three ingredients in the pig iron line.

The scrap that is used in the foundry may be classed into that which is made and that which is bought. The former we know all about, as it is simply the bad castings, and the gates and sprues of previous melts. The bought scrap, however, is something that has often upset all calculations as to quality when used in too great a quantity. In addition to the two classes of scrap mentioned, we have steel scrap added to strengthen castings, and then malleable scrap, wrought iron scrap, cast borings, steel borings, etc. Thus a mixture is made up of a number of things, and it is our work to see that the cheapest manipulation gives the highest grade results.

Building up a mixture intelligently has been one of the best accomplishments of science as introduced into foundry practice. The chemical composition is the basis of all the preparation of heats for making castings, whatever fine points may follow as indicated by the physical characteristics of the material in hand and the desired product. Our foundrymen's associations, guided by technically trained men, have brought about a gradual revolution in the practices of buying and selling pig iron, so that now at least three quarters of the iron produced changes hands on a basis of chemical anlysis, whereas formerly it was its fracture.

Granted that the foundry metallurgist has proven to his satisfaction that the analyses furnished by the furnaces with each carload of iron are in the main correct, he will nevertheless take the precaution to pile the metal in such a way that he is sure of uniform material when he uses it. This is best done by spreading the first carload of a given composition over the ground in a long row of pigs. The next carload goes on top of this, and so on until the pile is man high. Another pile is then commenced. In the meantime by drawing from the end of the first pile, an average of all the carloads thus stacked is obtained, and one analysis will do for many carloads of pig iron. In this way can one use specifications to advantage, for with a given class of work, such as miscellaneous car castings, is it possible to specify say four grades of iron, one to contain 1.75 percent silicon, the next 2.00 percent, then 2.25 percent, and finally 2.50 percent silicon. Of the two extremes but little will be wanted, but the bulk will be 2.25 iron. Now by placing all carloads with less than ten points of silicon below that required on the next lower pile, a very satisfactory arrangement ensues, and one can build up a mixture at the desk and be sure that it will work out all right, without troubling to see it.

In general, the more scrap used, the cheaper the mixture, but conversely, the less scrap used the better the melting loss. So a good mean must be selected, and this

*Abstract from a lecture delivered at the Case School of Applied Science, Cleveland, May 5, 1905.

is usually 60 percent pig, and 40 percent scrap. This is for general jobbing castings; special classes of work often require pig iron wholly.

Now in figuring a mixture, suppose that a good limit for the silicon has been found to be 2.15 percent for the castings. Then the 0.25 percent lost in melting added would mean 2.40 percent in the mixture. Let us say the cupola is charged up in 4,000 lb. layers of metal with the coke ratio 1 to 8 of iron. Of these 4,000 lb. of metal which should, at 2.40 percent silicon, contain 96 lb. of silicon, the pig iron is to form 60 percent of the charge and the scrap the other 40, or 2,400 lb. should be pig, and 1,600 lb. scrap. Now scrap is always considered to contain a little less silicon than the castings of the particular class from which the scrap originated, as no sane founder buys, say, stove plate scrap, with its high phosphorus, to mix into boiler work where specifications are the order of the day, and sound, strong metal is imperative. Hence for our purpose the scrap may be considered to contain 2.00 percent silicon. It is manifestly impossible to analyze every piece of scrap used, hence the necessity for arbitrary figures. Our scrap, 1,600 lb. at 2.00 percent equals 32 lb. of silicon. We now have 32 of the 96 lb. accounted for, and hence the pig iron must contain the other 64 lb. which with 2,400 lb. would approximate a silicon percentage of 2.65. This example, which by the way, is that of soft machine castings of medium size, shows that the yard must contain irons of higher silicon content than those given before. We must have our irons run 2.00, 2.25, 2.50, and 2.75 percent silicon in this case. Continuing the example we note that with pig irons averaging 2.65 percent silicon wanted, the mixture will be between the 2.50 and the 2.75 limits. Hence a simple trial calculation will show that it takes 2,000 lb. of the 2.75 percent silicon iron and 400 of the 2.50 percent silicon iron to do the trick. The mixture will therefore look like this:

1,600 lb. scrap, 2.00 percent Si.....		32.0 lb. Si.
2,000 lb. pig iron, say Warwick,	2.75 percent Si.	55.0 lb. Si.
400 lb. pig iron, say Clifton,	2.50 percent Si.	10.0 lb. Si.
4,000 lb.	Average 2.40	96.0 lb. Si.

It is also advisable to have some 4.00 to 5.00 percent silicon iron in the yard, say a carload at a time, in order to correct a too sudden tendency downward in the silicon of the mixture, as the result of improper working of the cupola or furnace. This also enables one to use lower silicon and therefore cheaper irons in the mixture. It is, however, not conducive to good results; the old maxim of putting into the cupola or furnace as nearly as possible the material one wants to get out of it, holds good in spite of all our advances in the science. It may further be added that if any steel is to be put into the mixture, the silicon must be correspondingly increased, as steel contains only a negligible quantity of this element.

In charging up the cupola, after the bottom has been carefully prepared, and the coke bed lighted up with shavings and kindling wood, the bed is brought up to the proper height, and charging commenced. The bed is usually made with a ratio of four to one, that is, for a four thousand pounds charge of metal one thousand pounds of coke goes in. This is, of course, for a pretty good sized cupola. Now after the first charge, the ratio is made ten to one, in fact the calculations are made so that the average of the whole heat is about one of coke used to melt eight of iron. The small coke charges between the batches of iron serve to keep the bed of coke underneath the whole heat at the proper height, it being essential to have over ten inches of coke above the tuyeres, otherwise the wind comes into contact with the iron too soon, and either chills or burns the metal. In charging steel scrap, this must be selected from boiler plate, rails, structural material, or steel castings, if obtainable. It must be neither too thick nor too thin, otherwise an irregular melting will result. Twenty-five percent is a good amount to use for very strong work. It can be raised up to 40 percent if desired, but everything above the 25 percent will take up so much carbon from the fuel that the value as a reducer of the total carbon is gone. Where much steel is used from two to four percent of ferro-manganese should be put into the ladle, as the added steel makes the melting point of the metal go up, and hence ferro-manganese gets in its work as a deoxidizer, a thing which is not practical with the low temperatures of ordinary gray irons.

We have so far only looked at the silicon. The sulphur is another important matter in a casting. Sulphur is the worst enemy of the foundrymen. It must be kept low, or there will be trouble in light castings. The calculation of sulphur in a mixture is similar to that given for silicon, but if precaution is used and the pig irons are kept low in this element, it need not be considered in the mixture calculations. Not only have we to contend with the sulphur of the pig irons, but also of the coke or anthracite, if this is used; the latter, however, giving far less trouble than the former. From 0.01 percent all the way up to 0.07 percent is added in the cupola, depending upon the sulphur in the coke and also its state in this material. It seems that only the sulphur which is in the ash of the coke goes into the iron, and especially when the heat is run cold. It is therefore best to use plenty of fuel to get good hot iron, as the chances are that much of the sulphur is driven off before the damage is done, as well as a better reaction had between the limestone and the impurities to be slagged off.

Anthracite, making a good hot fire, is a good melting fuel, where the price is not prohibitive, and belongs in the bed, the subsequent charges being of coke. In the air furnace, naturally only very rich bituminous coal can be used as a very long flame is wanted. In spite of only an indirect contact with the fuel, the iron of the bath will absorb some sulphur, and I have noted where a coal ran over 3.00 percent in sulphur, that the iron with only 0.03 percent sulphur originally came out with 0.23 percent and was worthless. Only a very basic slag made with an excess of limestone held this sulphur down to safety, until other coal was procured. As a side remark it may be added that the air furnace is becoming used more and more where a better grade of castings is wanted.

From the study of the daily mixtures and all that falls within this realm, the next important step taken by the technical man in the foundry is the purchase of the iron and fuel. The metallurgist is the most useful adjunct the purchasing agent of an establishment can have. Where this important functionary is of the order of the small potato, the technical man will have a hard road to travel, as endless and constant are the job lots of pig metal he will be asked to pass upon and take. No man, not familiar with the finesse of the constitution of metals can understand why of two pig irons with identical composition, one may be strong and highly desirable, and another will break in two on being dropped over a rail. Even the chemist cannot prove the difference in his laboratory, as the very solution of the samples destroys the oxidation which is the likely cause of the trouble. The testing machine, however, soon brings out the facts of the case, and if a new iron, the antecedents of which are unknown, is to be tried, the metallurgist can do no better than to arrange his mixture to take in a maximum of this iron, run it a day, then repeat it the next, with the scrap of the day previous, thus permeating the work made with this particular brand. Now test the bars cast and compare

with previous records. If equal or above the usual run, the iron is safe, if below, it were better to let it alone.

While the importance of silicon and sulphur has been specially dwelt upon, it is their effect on the relation of the carbon content in a casting that is really aimed at. Whether a piece of cast iron is gray and soft, gray and hard, mottled or white, and only amenable to the emery wheel, depends upon the proportion of combined carbon present out of a high or low total carbon. Thus with 3.5 percent total carbon, 0.20 percent of which is combined, 3.30 percent being graphite, the casting is practically a twenty carbon steel, with a big amount of graphite to lubricate the tool which cuts it, and at the same time weaken the structure. This is a soft gray iron casting. Run the total carbon down to say 2.80 percent, but keep the combined carbon the same, and we have a much stronger gray iron, which is still soft, and almost as easy to machine. Now if you run the combined carbon up, you make a tool steel of the matrix, with whatever graphite is present to weaken the structure. The metal, however, is now hard to tool. As the combined carbon is carried to the full amount of total carbon, we get the white irons, which are used for rolls, malleables, and usually require subsequent heat treatment to become serviceable in the industry.

The state of the graphite and the combined carbon of a casting is the direct result of several variable conditions. First the silicon content (and in a lesser measure the sulphur), which when above 1.75 percent makes gray to black fractures in a casting, and when below may make from light gray to dead white, according to circumstances. The second variable is the thickness of the casting which controls the cooling rate of the metal after it is poured. Lastly, the temperature of the melt has its effect. A hot pour always makes harder iron than a dull pour.

The combination of these three variables is the sum of our results in the foundry, and a careful balance brought to bear on the mixture made, is what puts the value on the man in charge. Naturally it takes years of experience to handle these points with confidence and accuracy, but it is only by trial that one learns.

The metallurgical problems in the foundry are by no means easy nor few. It takes years of close observation, and contact with big tonnages of every kind of work to become expert. The difficulties of the ordinary gray iron foundry are as nothing compared with the making of rolls, car wheels, and especially the malleable casting, the latter having the added difficulties of an elaborate heat treatment which depends in its efficacy upon the close adjustment of the composition and melting process.

The techincal man has, however, not only the metal to look after, but a foundry gives him plenty of opportunity to show his ability in the mechanical end of the establishment. Not only the steam engineering, and more than this at present, the electrical equipment, will come under his jurisdiction, but he will find many a problem in the little details of the foundry other than the metallurgical end. Let him go on the molding floor, and take stock of the various sands used, the molding machinery, the cupola arrangements. Even the charging of the cupola will in general bear the closest watching to get even melts out of it. In the pattern shop it is the constant cry to get the easiest method for the molder and not for the patternmaker, and many are the sins committed in the pattern shop which it costs heavy money to correct afterward.

The making of a good mixture is not a guarantee that the castings will be right, for after tapping there are a lot of opportunities of spoiling good work. The metal may be poured too hot, or held too long before pouring. The molds may be badly vented, and not let the gases off fast enough. The iron may be poured so that it will shot, or that slag gets into the mold. In fact a thousand or more things may conspire to get bad results, and usually the foreman of one department blames it on the other, and so on. None of them has done anything amiss. And so the physical difficulties also tax the ingenuity of the technical man, whether the foundry produces three tons of castings daily or three hundred. Hence the necessity of coolness and good judgment in applying remedies for manifest evils, lest greater ones result.

BOOK REVIEW.

Machine Shop Tools and Methods, by W. S. Leonard, New York. John Wiley & Sons. 6 x 9 in. 554 pages, 689 illustrations. Supplied by *the Iron Trade Review* at $4.00

This book possesses one of the greatest merits that any book can possess, that is, it was written to fill a definite want, and hence every part was carefully considered. The author is instructor in machine shop practice and practical machine design at the Michigan Agricultural College. To aid him in his instruction work he first got out the book in the form of blue print notes. After several editions of these, the work was submitted to the present publishers, who have now gotten out the third edition which is revised and greatly enlarged. The matter in the book is designed to serve as an aid in connection with the lectures on machine shop methods given in the Mechanical Department at the Michigan Agricultural College and hence many elementary examples are given and for illustration's sake the simplest form of machine is frequently described first. More complicated machines and later applications are then shown. The author acknowledges his indebtedness to many writers upon these subjects and especially to the *American Machinist,* and *Machinery;* also to many manufacturers who have assisted him in preparing the work or by furnishing cuts.

One writer has likened the newspaper man to one who writes on the beach as the tide comes in, for his writing is so soon swept away, and other is written to take its place. In all lines of literature it is necessary that some one cull out the good and preserve it in permanent form. This is certainly what Mr. Leonard has done in the case of many valuable machine shop methods, tools, and devices and the book will be found of great value either to the student, professor teaching shop practice, or to the experienced machinist or toolmaker. It would be impossible in the compass of a short review to outline all that the book contains, but in brief, it may be stated that it is a general guide to shop practice. The author does not pretend that it is a complete encyclopedia of shop practice, but he has certainly written a book which fills the requirements of the purpose for which it was written, and hence is deserving of more than passing notice of all connected with the different branches of shop work. At the back of the book there is a list of 347 questions which it would be well for any apprentice or other learner to try to answer from the text, as this will serve to fix the matter in mind.

The apprentice will find in this book just the simple descriptions of the tools and machines with which he is surrounded, that he has been looking for. The journeyman will find many new kinks and the "reason only" for those problems that have been introduced by new shop conditions.

COST OF PRODUCING STEEL CASTINGS BY THE OPEN HEARTH PROCESS AND THE SMALL CONVERTER.

BY L. UNCKENBOLT.

The small open-hearth furnace and the small converter are not really rivals, each having its proper field of action and suitable uses, and any attempt at replacing one by the other will prove an economic failure. A four to five-ton open-hearth furnace for cast steel can only product castings exceeding about half an inch in thickness and one cwt. in weight, without wasting three to four tons of the charge; the contents of the furnace cooling down so quickly during the casting that the steel becomes insufficiently fluid to run into small molds. Now the converter enables castings of any size to be made, and is particularly profitable when those of small dimensions (less than ½ in. thick and one cwt. in weight) are to be produced; in fact, Belgian foundries make, by its aid, castings of one pound weight and ⅛ in. thick, such as could only be obtained formerly with crucible steel, malleable castings, or the hydraulic press. However, it is not advisable to erect a steel plant solely for the production of small goods on which a large profit is made, the work of casting being in this case very complicated. In order to avoid this inconvenience, it is necessary to produce large articles as well, in a proportion that can easily be determined by experience.

The cost of a simple steel plant, with a single cupola capable of treating about three tons per hour, and a one-ton converter, will be, for the cupola, £80; the fan, £20; the converter, £200; the blower, £100; the reheating furnace, £40; the drier, £40; the sand blast machine, £120; two drums and two mills, £40; several casting ladles and other accessories, £120; crusher and disintegrator, for sand, £40; small pattern shop, £80; total, £880.

Should the business after a while entail an increase in the plant, the following additions could be made: a second drier, £60; a second reheating furnace, £60; an electric welder for repairing small superficial defects, £200; several grinding machines, £100; one or two cold saws, £60; a small chemical laboratory, £120; a testing bench, £80; total, £680.

To this outlay must be added the cost of buildings, source of motive power, a hoist, a platform for the cupola, a weighbridge for the yard, and a five-ton traveling foundry crane, the whole amounting to £2,000 to £3,000.

Statements have recently appeared in the German technical press to the effect that small converter steel plants can be erected at less than the above figures; but it is hardly probable that such plants would be able to compete with those already existing, it being essential to success to furnish consumers with a good article, quickly and at a low price.

The motive power required will be 5 to 10 h. p. for the fan, 5 h. p. for the hoist, 50 h. p. for the converter blower, 7 to 10 h. p. for the sand blast machine, 10 to 15 h. p. for the drums, 5 to 10 h. p. for the sand-preparing machinery, and 3 to 5 h. p. for the pattern shop. Later on this can be increased by 5 to 10 h. p. for working the converter, 30 to 40 h. p. for the electric welder and 10 to 15 h. p. for the saws, lathes, traveling cranes, planing machines, and testing bench. It will not be necessary to keep all the machines working continuously. For example, to produce one ton of steel, the cupola fan is worked for half an hour, the converter blast half an hour, the converter mechanism three to four minutes, and the hoist five minutes. In this way, a 100 to 500 h. p. engine will be sufficient, though it is always better to have too much power than too little. A traveling crane of 5 to 7½ tons capacity is a prime essential, since it will enable all orders to be executed, even with only a single cupola and one converter.

The steel from the converter is at such a high temperature that several charges can be collected into a large heated ladle, so that very large castings can be produced when required. The author has made castings of 3 to 5 tons each in this way without difficulty.

The cost price may be calculated as follows: To obtain one ton of molten steel, as it issues from the converter, the materials required will be: 14 cwt. of Bessemer iron, at 56s.=39s. 2d.; 4 cwt. of hematite pig, at 62s. 6d.=12s. 6d; 5¼ cwt. of scrap, at 44s.=11s. 6d.; ½ cwt. of complementary materials (ferro-manganese, ferro-silicon, ferro-aluminum)=5s. 8d.; 4⅝ cwt. of foundry coke, at 17s. 6d. =4s. 2d.; 2½ cwt. of gas coke for heating the ladles, drying the molds, etc.=1s. 6d.; or together, 74s. 6d., as the cost of the ton of steel. From this quantity must be deducted 5 cwt. for waste in casting, and worth only the price of scrap (44s.), viz., 11s., leaving 15 cwt. of steel costing 63s. 6d., i. e., 84s. 8d. the ton.

The cost has to be increased by the items for labor, upkeep, and motive power, as follows: In respect of labor, there will be needed for an output of 25 tons, two men for the cupola, at 3s. 6d.=7s., and two for the converter at the same rate of pay, or 14s. in all, which works out at a little over 7d. per ton. With regard to the upkeep of the cupola and converter, a 1-ton converter working every day, will usually give 60-80 pourings before needing repair. But assuming that it needs repair once a fortnight, and that during this period 50 pourings have been made, the refractory lining will cost £5 and the labor 14s., which together with 6s. for the repair of the cupola, makes £6 for an output of 50 tons, or 2s. 5d. per ton.

To produce 25 tons a week will entail the following outlay for motive power: 5 h. p. for 1¼ hours to work the hoist, costs 1½d.; 10 h. p. for 12½ hours driving the cupola fan, 2s. and 50 h. p. for an equal period, driving the converter blower, costs 10s. or 12s., 1½d. in all, making in round figures 6d. per ton. The total cost of the ton of steel is therefore 84s. 8d.+7d.+2s. 5d.+6d.=88s. 2d. This may seem high, but is an outside figure, having been obtained on the basis of an output of 20 to 25 tons per week with a plant consisting merely of one cupola and a single converter. Hence the cost would be considerably reduced in a plant with two converters, since in the latter case a larger number of pourings could be made without interruption, thus greatly diminishing the outlay for coal and coke.

No doubt the objection may be urged that steel can be produced much cheaper in the open-hearth furnace, but it should be remembered that this furance, when once started, must be kept going at all hazards, whatever the state of the market, a condition that will undoubtedly prove onerous in the long run. With the converter, on the other hand, work can be suspended when trade is bad and orders slack, so that no loss is being incurred, even if no profit is being made.—[Iron & Coal Trades Review, London.

There are two men who will probably not hold their jobs very long—one is the man who does not *make good*, the other is the man who does his work so well that he shows his capability for something more. Observe for yourself. Note the men about you and study their characteristics and see how efficiently they are doing their work. You can predict fairly well whether they will be doing exactly the same thing in a year, or something larger or smaller.—(Electric Journal.

IGNORANT JUDGES

MAKE TRIAL OF PATENT CASES IN ENGLAND UNSATISFACTORY.

Letter from John Perry, the Eminent English Philosopher and Educator—Teams Not in Step.

An as aftermath to a recent discussion in the columns of *The Iron Trade Review*, we publish below a letter from the English philosopher and educational reformer, Prof. John Perry, which was written in reply to a request for his views on the proposed Court of Patent Appeals. It may be necessary to remind some of our readers that Prof. Perry is at the head of "England's New Science Teaching," and that his views have had a considerable effect even upon the conservatism of the English universities.

Prof. Perry was one of three Englishmen who founded the University of Tokio; the teachings of which have perhaps more than any other thing enabled Japan to win so many victories in the contest with Russia:

Board of Education. Royal College of Science, London, South Kensington, S. W.
July 4, 1905.

Dear Sir:—I am sorry to say that I have no time to write you a letter on the subject of "A Special Court of Appeals." As chairman of the engineering group of science subjects, taught to some hundred thousand evening class students, I have just finished the yearly examination work. To-morrow I start a three weeks' course of instruction to teachers who come to London from all parts of Great Britain. They work with me from 10 a. m. to 5 p. m. every day. I wonder if you have such good institutions as these in America.

As general treasurer of the British Association for the Advancement of Science, I have for months had much to do with the arrangement of a great meeting to be held in August and September in South Africa. About 400 members are going from England. The official party of 200 includes some distinguished Americans. We shall get much hospitality. I and a large part of the official party start on the 29th of this month. We shall return from the Zambesi Falls (said to be four times as powerful as Niagara) by the Red Sea and Egypt.

I have now given you a few reasons why I cannot write a letter. Another is this: I have been to America five times, but I do not know America well enough. In England our lawyers and judges almost without exception are quite ignorant of the most elementary facts of physical science. In a patent case the court has to be educated in these matters at a terrible expense, and at the end of ten days or twenty days one sees that the judge is nearly as ignorant as at the beginning. He thinks he knows, but really he has only some fixed impression given him by that lawyer who has been most successful in studying his idiosyncrasy. Our system of education is altogether bad and I am not sure that yours in America is any better than ours.

It is criminal to allow men to grow up quite ignorant of the study of Nature, unable even to take a lesson from Russia and Japan. Of course your court of appeals ought to have a knowledge of physical science as well as of legal science—but unless you get men who have both kinds of knowledge there will be trouble. A lawyer ignorant of physical science and a scientific expert make a team that are never in step and they pull different directions—still it is better to have this than to have physical science altogether unrepresented.

I don't know if you ever see *Nature*, published by Macmillan & Co. There is an article of mine in last week's copy (28th June) dealing with this subject to some extent. I am sending you a short note that I wrote for our college magazine about my visit to America last year. Also a copy of an address delivered at Oxford. These will tire you more than a letter yould do. With kind regards I remain, Yours truly,

JOHN PERRY.

An examination of *Nature*, shows that that magazine is taking up the general subject of the social influence of scientific education and the articles are of radical type—sledge-hammer blows are struck at "Oxford" conservatism. They might make stimulating reading for even the presidents of some of our prominent universities. The above off-hand letter illustrates the spirited characteristics of the writer and will be read with pleasure by the many Americans who have watched his successful progress with sympathetic interest and cordial satisfaction.

The remarks about the English courts will be recognized as quite applicable to our own. The expert is apparently a necessity in a patent case, but "the pulling in opposite directions" is an evil that would, no doubt, be mitigated by creating a technical element in the court itself. The entire court would be made up of intelligent gentlemen, who would observe rules of courtesy and would understand how to profit by each other's special acquirements.

The following quotations from published decisions in American patent cases may be interesting in connection with the remarks of the above letter:

"Were the patent taken bodily from Holy Writ no more antagonistic dogmas and warring theories could be deduced therefrom. Where so many accomplished specialists disagree, where so many propositions have been advanced tentatively and withdrawn, where reasons for certain phenomena are conceded to be wholly unknown, the ordinary layman may, perhaps, be pardoned for suggesting that a document which has brought about such a condition of affairs, is not written in the clear language which the patent law requires."—[Bracewell vs. Passiac Print Works, 107 F. R. 467.

"Even were it possible to do so, it is surely unnecessary to follow all the excursions of the experts into the occult realms of electro-chemical science. Some of these trials seem to vanish into thin air, others are lost in a desert of technicalities and of others still it is true that he who attempts to travel them is quite likely to find himself wandering aimlessly "through caverns measureless to man."—[Electric Smelting & Aluminum Co. vs. Pittsburg Reduction Co., 125 F. R. 926-938.

"At the hearing we gathered an apprehension of the conclusions which we must reach. Our subsequent investigations have not changed that apprehension; and, although it has increased our doubts with reference thereto, yet we are satisfied that they would not be removed by further consideration of the case, and that the interest of the parties will be better advanced by a disposition of the suit which will enable an appellate tribunal seasonably to review it rather than by holding it longer under advisement."—[Bradford v. Belknap Motor Co., 105 Federal Reporter 63.

"This case relates to applied dynamic electricity with reference to some of its most complicated and delicate phases. A thorough understanding of the purposes which the inventor sought to accomplish, and the principles applicable thereto, in the absence of a thorough explanation by experts of both practical and scientific attainments in the art, requires a mastery of the particular science to which the patent in suit relates. Although the patent issued in March, 1895, the inventor's device never has gone into commercial use, and no practical machine illustrating

it has ever been constructed. Neither has the court been assisted by any model, and the expert testimony on either side proceeds too much on the assumption that the court has special knowledge which it would not be justified in making use of, even if it thought itself possessed of it."—[Packard vs. Lacing-Stud Co., 16 C. C. A. 639, 70 F. R. 66-7; Parsons vs. Lulge, 40 C. C. A. 484, 100 Fed. 452-454; Boston & R. Electric St. Ry. Co. vs. Bernis Car-Box Co., 25 C. C. A. 420, 80 F. R. 287, 290.

The following quotation seems somewhat opposed to the last clause of the preceding paragraph:

"In the Circuit Court the judge referred to matters within his own knowledge, but not of record. The Appellate Court said: 'That he freely stated the facts he had in mind * * * tends no more to invalidate or impeach his decree than the fact that he had this knowledge. Extended experience in the affairs of life does not disqualify a judge who does not seek to use it unfairly.'"—[Thompson Scenic Ry. E. vs. Chestnut Hill, etc., 127 F. R. 703.

IRON AND STEEL INSTITUTE.

Program of the Autumn Meeting to be Held at Sheffield.

The program for the autumn meeting of the Iron and Steel Institute to be held at Sheffield, England, from Sept. 26 to 29 next, will include the following papers: "The Metallurgical Department of Sheffield University," by Prof. J. O. Arnold, Sheffield; "The Thermal Transformation of Carbon Steels," by Prof. J. O. Arnold and A. McWilliam, Sheffield; "The Nature of Troostite," by Dr. Carl Benedicks, Upsala; "The Occurrence of Copper, Cobalt and Nickel in American Pig Irons," by Prof. E. D. Campbell, Ann Arbor, Mich.; "Pipe in Steel Ingots," by J. E. Fletcher, Sheffield; "Steel for Motor Car Construction," by L. Guillet, Paris; "The Presence of Greenish Colored Markings in the Fractured Surface of Test Pieces," by Capt. H. G. Howorth, Sheffield; "Overheated Steel," by Arthur W. Richards, Grangetown, and J. E. Stead, Middlesbrough; "A Segregation in Steel Ingots," by B. Talbot, Middlesbrough; "A Manipulator for Steel Bars," by Douglas Upton, Jarrow; "Machinery for Breaking Pig Iron," by Cecil Walton, Whitehaven; "The Influence of Carbon on Nickel and Iron," by George B. Waterhouse, New York city.

The program of the meeting is as follows: Tuesday, Sept. 26, 10 a. m., reception of the president, council and members of the institute in the Firth Hall of the Sheffield University, by The Lord Mayor, The Vice-Chancellor of the Sheffield University, The Master Cutler and Col. H. Hughes and members of the reception committee; reading and discussion of papers; 1 p. m. adjournment to the Cutlers' hall for luncheon. After luncheon the University Metallurgical Department will be open for inspection; also Weston Park, the museum and Mappin art gallery will be reserved for members of the Institute between the hours of 2:30 and 5:30 p. m. The works of the Sheepbridge Iron & Coal Co., Ltd., near Chesterfield and the Britannia Works of Messrs. J. Hopkinson & Co., Ltd., Huddersfield, will be open for inspection. At 9 p. m. a reception will be tendered by the Lord Mayor at the town hall. Wednesday, Sept. 27, 10 a. m., reading and discussion of papers at the university; 1 p. m., inspection trips to the East Hecla works of Messrs. Hadfield's Steel Foundry Co., Ltd., and to the iron and wire rope works of Messrs. W. Cooke & Co., Ltd., Tinsley; 8 p. m., members of the institute are invited to dinner at the Cutlers' hall by the reception committee. Thursday, Sept. 28, 10:30 a. m., different works in and around Sheffield are open for inspection, and the members are requested to visit them; 9 p. m., a dance and reception to be held at the Cutlers' hall by invitation of the president and Mrs. R. A. Hadfield. Friday, Sept. 29, 10 a. m., members and ladies will leave the Great Central railway station by special train for Worksop, thence by conveyances to Welbeck via the Sparken Hill entrance. Luncheon will be served at 1 p. m. in the riding school, after which the drive will be continued to Edwinstowe. At 9 p. m. there will be a display of fireworks and musical selections will be given at Wincobank ridge.

PACKING MACHINERY FOR EXPORT.

Mr. Paul Roux, a member of the American Chamber of Commerce at Paris, has prepared a paper entitled, "The Packing of Machinery for Export." The following notes are taken from the paper to which attention of American exporters is invited:

In packing goods for export care should be taken to economize space, to avoid breakage and exposure, and to be ready for rough handling. Goods should, if possible, be kept within 40 cubic feet per ton. Projecting parts should be removed and packed separately. They increase space and increase risks of breakage.

The parts should be so marked as to absolutely preclude the possibility of error. Herein will be found more than half the success of securing foreign trade. Not a single piece, no matter how simple, should be packed without its localizing mark. It is impossible to emphasize this point too much. Always dismount all fragile and projecting parts. Leave no delicate parts exposed. Plug up oil holes. Put on the best possible coating. It pays. Be sure to put on enough, particularly on all exposed parts.

Merchants and manufacturers should look carefully into the matter of weights and measures. They mean much in the questions of trade. Rates are often regulated on the weight basis. For example, goods weighing more than four and a half tons pay, as a rule, twice as much as do those under two tons. Large and heavy bales increase the costs of loading and unloading. Packing is a science and an art. The making of boxes has been the subject of scientific and mathematical work of the highest kind. Before a box is bought or built the merchant or manufacturer should go carefully into the minutest details as to the character of the box wanted. Care should be taken to permit of easy and efficient examination of the machine or parts packed, even to the admission of a lantern to reveal the parts. For this purpose it is a good plan to fasten one side of the case with screws, usually the side that permits of the best examination. Care should be taken in lining, or not lining, with paper, sheet tin, etc. Here questions of atmospheric effects often are very important.

Every box should be accompanied by its own list of pieces, and, when possible, by drawings of the parts and the complete machine. This helps the adjusters. It is not a bad idea to send with each machine any particular or peculiar tool that may be found useful or helpful in adjusting the parts.

Next in importance to marking the parts of the machines is the marking of the cases. It should indicate the weight, gross, net (absolutely exact), volume, and port of destination, the latter in large letters, at least two inches long. Marks of identification on each end of a case are of great value. A mark of some kind should surround the heads of nails or screws, which should be removed to unpack the machine.

From the selection of the material, to the building and packing of the box, to its delivery in far off parts of the world no pains must be spared.

FINEST TECHNICAL SCHOOLS

In the World are Found in America. Says Sir William Mather.

Sir William Mather, M. P., LL.D., proprietor of the Salford Iron Works, has been revisiting America to observe our progress in industrial and educational affairs, as well as to receive the degree of LL.D. from Princeton. He first came to this country in 1883 as a member of the royal commission on industrial education.

In the course of his travels in this country in 1883, Sir William went to Boston to study the system in vogue at the Massachusetts Institute of Technology, and this system so deeply impressed him that upon his recommendation it was made the basis of the curriculum adopted for the English trade schools. The methods employed in Germany and Austria were thoroughly discussed, but the conclusion of the commission was that the methods employed at the Boston institution were the best. A parliamentary report on the work of the commission resulted, in 1889, in the passage of the technical education act, which went into force the following year. Under this act trade schools, largely for agricultural purposes, were established throughout the kingdom. Support was provided for them by means of a local tax of one penny on every 100 pounds of the rentable value of property. Workshops were attached to the schools, the idea being to give the pupils some practical experience as well as mere technical instruction.

The English trade schools, therefore, have been open for 15 years, and with what result may be learned from this conversation with Sir William when he was in Boston a few days ago, as reported by the *Transcript*:

"Our day schools are comparatively neglected, but at night, during six months of the year, from May to October, they are crowded with artisans eager to learn the technical side of the various trades in which they are engaged. That describes the situation in a nutshell. There is a fundamental fault, and that is the indifference of English parents in general toward the sound, practical education of their children. It is so different from what I have observed during my two visits to this country. Here you have what I must call a positive passion for education. American parents seem to encourage their children in the ambition to get all possible good out of your free educational institutions. The result is your universal system of consecutive and co-ordinate education, whereby the training of mind and hand is conducted in an ordinary and attractive manner. Your secondary schools are, it seems to me, one of the glories of the country.

"There—and I say it with sincere regret—is where our great weakness lies. In England we have no secondary schools. The boy who leaves the elementary school has one of two paths to follow: He must go either to work or to some private school to prepare for the university. The average boy goes to work, and the average parent, accustomed to this deplorable system, accepts the situation as a matter of course. We have the schools, but we lack the support and interest of the parents, without which ours must be an almost hopeless task. Our duty must be to install into the mind of the English parent some of the pride and self-sacrifice that, to my mind, adorn the conduct of the American parent.

"Really, as a champion of technical education who has done his best, and who has seen such poor results, I am discouraged by my visit to America. Even when, a short while ago, I was in the West, in your young towns and cities, I could not help noticing the presence of your fine, large schools, with their overflowing classes. What a grand spectacle! You have no idea how impressive this is to the Englishman who has made a study of his educational system at home. If anything, I should say that the interest in popular education is keener in the West even than it is in the East.

"The highest example of technical schools to be found in the world is here in America. The best of them all, according to my observation, is the Massachusetts Institute of Technology, which is turning out at present the finest set of scientifically trained young men for industrial and commercial purposes to be met in the world. The institute represents the standard of excellence in technology at which we in England hope some day to arrive."

Not a Favorable Prospect.

Toronto, Canada, Aug. 15.—The question of the possibility of developing the iron and steel manufacturing industry in British Columbia has been carefully considered from time to time in connection with the large mining and railroad interests. With the rapid development of the coal mining industry, for much of the output of which a market was to be sought in the United States, and the progress of settlement in the Canadian Northwest furnishing an increasing market for iron and steel products, an increased amount of attention has been given to the subject. George G. S. Lindsey, vice president and general manager of the Crows' Nest Pass Coal Co., of British Columbia, who has carefully studied the subject, expresses the opinion that there is no likelihood of the profitable development of the iron trade while conditions remain similar to those at present. The turning point of the whole matter is the question of a market. The population of British Columbia is small, only 178,000 by the census of 1901, which even together with that of the adjacent prairie region, which might become tributary, would not furnish such a market as would enable manufacturers to go extensively into the production of the finished product. The experience of Sydney, N. S. and Sault Ste. Marie shows that the day for the production of pig iron and steel billets as marketable commodities has gone by. Iron production to be remunerative must be carried on so as to turn out the finished article—finished at least up to the secondary stage—in the form of rails, rods, plates, etc. The cost of haulage, a specially heavy item in British Columbia on account of the heavy grades, makes it impossible for the primary industry to compete with the finished or partially finished product at the same point. Except in the event of an outside market, accessible by water being secured, there seems no immediate opening for iron and steel manufacture in that province.

Down the St. Lawrence in September.

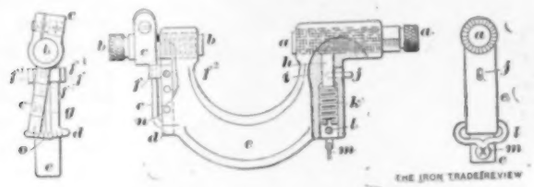
To a man with the vacation state of mind, who, for business or other reasons, will not have the opportunity of realizing his hopes until September, the St. Lawrence River trip is the most inviting. The St. Lawrence River has a climate all of its own in September—delightful days of sunshine, cool and refreshing nights; no rough weather to mar the trip; scenery unequaled on the continent, together with the facilities which the Richelieu & Ontario Navigation Co.'s steamers offer to its patrons for comfort and health, all go to make up one of the most pleasant outings imaginable. Taking the company's palatial steamers at Toronto, the trip embraces a sail through Lake Ontario, the picturesque Thousand Islands (America's Venice), the exciting descent of all the marvelous rapids to Montreal; thence to Quebec, Murray Bay and up the far-famed Saguenay River. The scenery of the Saguenay is simply incomparable for wild grandeur and variety. For illustrated guide, "Niagara to the Sea," send 6 cents postage to Thos. Henry, traffic manager, Richelieu & Ontario Navigation Co., Montreal, Can.

ADJUSTABLE LIMIT GAUGE.

An adjustable limit gauge which is the invention of Thomas Humpage of England, has been patented in the United States (No. 781,524, Jan. 31, 1905.)

In the construction of the instrument illustrated, both the spindle *a*, for adjusting the standard bar lengths, and the anvil *b*, for setting to the limits of inaccuracy, are screw-threaded. On the outer end of the anvil *b* is clamped a lever *c* which is the limits-lever. The limits-lever, which is preferably graduated extends to a quadrant *d*, formed on or attached to the frame *e* of the instrument. An adjustable sliding stop f^1, having lugs *f* on each side of a central tongue f^2, determines the range of the limits-lever laterally on either side of a zero line, borne midway on the quadrant *d*. The extent of lateral range of the limits-lever varies with the position of the slide *f*, the tongue f^2 of which rides in a groove *g*, in the instrument frame. The range of lateral movement of the limits-lever deceases as the slide *f* is moved farther away from the anvil *b*.

In using the gauge the center line of the limits-lever *c* is brought to coincide with the zero line of the quadrant *d*. Adjustment is then made to a standard bar, which is of length nearest the dimension to be worked to. This adjustment spindle *a* and the further adjustment from the standard length bar to the required dimension to be worked to is also made as ordinarily, by turning the spindle *a* to the requisite extent, guidance in this respect being afforded by the zero line on the spindle and the graduations on the outer face of the spindle socket. The gauge is under this invention, fitted with means for locking the spindle *a* after adjustment has been made. It is also provided with a sealing or supplementary locking device which is so arranged as to necessitate fracture of the



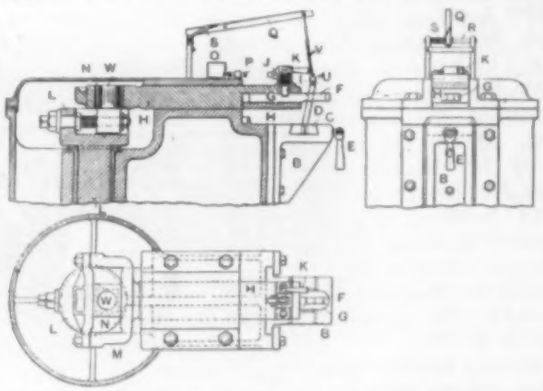
ADJUSTABLE LIMIT GAUGE.

device before the spindle can be locked. The sealing or supplementary locking device serves as a "telltale" in event of tampering after adjustment.

The adjustment above set forth having been made, the limits-lever *c* is next moved until its center line coincides, at one side of the zero line *o* of the quadrant *d*, with the graduation on the quadrant which corresponds to the predetermined limit of end motion allowed in one direction to the anvil *b*. The anvil *b* is thus turned to the extent which gives the requisite degree of end movement in one direction. The graduations of the quadrant *d* relate on one side of the zero line *o* of the quadrant to the limit of maximum. On the other side of the zero line the graduations relate to the limit of minimum. Accordingly, the lever *c* being set for limit in one direction, the corresponding limit in the opposite direction is also fixed. The limits having been fixed, the slide *f* at the anvil end of the instrument is next adjusted in the frame *e* to meet the lever *c*, moved to the limit graduation of the quadrant *d*, as aforesaid. The numerals on the graduation of the lever *c* express decimal fractions of 1-1,000 of an inch, and the reading signifies the extent of end movement of the anvil *b*. The slide *f* is next secured in place by a device not here shown, namely, a lead wire, so that the limits-lever *c* cannot move at either side beyond the set limit, the slide *f* constituting a stop preventing further movement of the lever.

VIBRATORY-ACTION TESTING MACHINE.

A vibratory action testing machine, the joint invention of Prof. J. O. Arnold, W. F. Ibbotson and R. Green, of Wellington Works, Sheffield, is described in the *Mechanical Engineer* of London. This machine is shown in the accompanying illustration. In this machine, metal is tested by means of a vibratory motion imparted to one end of a bar, the other end being held stationary in the machine. The number of vibrations are mechanically counted and recorded. The machine in its general appearance resembles an ordinary shaper, provided with a removable cover. An adjustable table, shown at B in the illustration is mounted on the front of the machine. A pair of dies, C, are placed in a slide formed in the table. In grooves in the dies, the test piece, D, is placed, the dies being locked by the screw E. A disengaging arm G, slides telescopically in, and projects from the front end of the main horizontal reciprocating slide H. The upper end of the test piece passes through an elongated opening in the disengaging arm. The disengaging arm is free to slide out of the main slide H, until it is secured in the desired position by a spring bolt I. This bolt is carried above the disengaging arm by the slide H, and is forced through its opening by a spring J, dropping into a corresponding recess in the arm. It is



VIBRATORY-ACTION TESTING MACHINE.

raised by means of the lever K, and the arm is then not affected by the motion of the slide. The reciprocating motion of the slide is produced by means of the vertical shaft L, which is driven by an electric motor. At the back of the slide H is a crosshead M, with a slide block N. On the top of the vertical shaft is an adjustable crank pin W, engaging with the crosshead. By moving this pin any desired adjustment of the length of stroke can be obtained.

The vibrations are recorded by a mechanical counter O, actuated by a push-rod P, which is pushed in at every return movement of the slide H, and returned to its original position by means of a spring.

The testing is started when the machine is at full speed or thereabouts. The bolt I joining the arm G and the slide H is not dropped until the machine has attained the desired speed.

For stopping the counter as soon as the test piece breaks the following method is used. The lever Q is pressed upward by a strong spring. It is joined to the upper end of the test piece by a spring V and a shackle U. A connecting rod, not shown, joins the lever Q to the stop mechanism of the counter. When the test piece breaks the lever is released and is pressed up by the spring S, bringing the counter stop-mechanism into play and stopping the record.

THE HOUSE OF MITSUI,

Which Handles Large Amount of Japanese Foreign Commerce.

The House of Mitsui, in Japan, is the firm which recently purchased railway supplies in this country for the Japanese government. It handles one-seventh of the total foreign trade of Japan, operates coal and silver mines, conducts a banking business, and owns the most important machine shops in the Far East.

It was a department of this house, Mitsui Bussan Kaisha, which recently placed the order for rolling stock in this country, for use in Manchuria by the Japanese government. The House of Mitsui is an institution, which, for the magnitude of its operations and its influence upon the world's commerce, ranks with the greatest corporations of this country and Europe. Besides carrying on a multitude of industries in the home country, its foreign business, both the export and import, for one year amounted to 90,000,000 yen. The activities of the house comprise banking, foreign and domestic trade, mining, and manufacturing.

The organization is a joint association consisting of eleven families or partners which work with the collective capital of its members, under a system devised by Takatoshi, the real founder of the house, more than two hundred years ago. According to the social system of Japan, the family is the unit of society, and not the individual, as among ourselves. In the case of the House of Mitsui there is no property to which any member can enter an absolute claim. The present head of the family council is Baron Hachiroyemon Mitsui, with headquarters at No. 1 Surogacho, Nihonbashiku, Tokio.

THE HOUSE OF MITSUI, TOKIO, JAPAN.

Mitsui Ginko, or the Mitsui Bank, is the oldest and by far the largest private bank in Japan, and has branches in all the principal cities of the empire. It also owns and operates large fireproof warehouses in Tokio and Kobe. It was for aid rendered the government in a time of financial stress that the present head of the house and other members of the family were elevated to the Japanese peerage.

Mitsui Bussan Kaisha, the department of the organization known in this country and Europe as Mitsui & Co., was established in 1876. It is engaged in all sorts of export and import trade, and has branches in nearly all parts of the world. It exports a great variety of products, ranging from raw silk to coal. Among the imports are steam vessels, warships, ordnance, locomotives, structural steel for bridges, electrical machinery, cotton, wool, rice, sugar, pig iron, steel, wire, lead, tin, and other metals, machinery of all kinds, railway material and equipment. The company also represents several well-known European and American firms in Japan, China and Corea; among others the American Bridge Co., the Carnegie Steel Co., the General Electric Co., Vickers Sons & Maxim, and John Musgrave & Sons. The company also owns a fleet of seven steamers aggregating in gross tonnage more than 20,000 tons.

Mitsui Kosan Kaisha, the mining department, operates the Miike, the Tagawa, and the Yamano coal mines, the Kamioka silver and lead mine, the Tsurugisan and the Iwanobori sulphur mines, and the Shibaura Engineering Works. The latter is the most complete plant for the production of machinery in Japan and probably in the Orient. The chief products are: boilers and engines, earthquake-proof steel chimneys, railway bridge material, pumps, mining machinery, sawmills, dynamos and electrical machinery of all kinds.

Japanese Industries.

According to a consular report the metal trade of Kobe and Osaka has shown a decided increase. The government foundry at Kiushiu has not interfered to any extent with the trade, having all it can do to attend to government requirements. The large amount of machinery imported during the past year was due principally to the heavy purchases on the part of the government necessitated by the war, and also to the increasing demand for labor - saving machines in Japanese dockyards, factories and other works. The port of Kobe has a shipbuilding yard which, it is stated, is prepared to compete with any firm in the East or West. The plant is described as complete and up - to - date, with electricity as the motive power. The Kawasaki Dockyard Co. at present has the monopoly in the shipbuilding industry at Kobe, but it will shortly have a competitor in the field in the establishment under the auspices of the Mitsu Bishi Co., well known for its shipbuilding plant at Nagasaki. At Osaka, a private shipbuilding yard, known as the Osaka Iron Works & Dock Yard, turns out excellent work. The concern employs some 2,500 workmen.

Tariff Concession by Russia.

Coincident with the desire to accomplish it at once and directly, steps are being taken by the minister of finance of Russia to readjust tariff regulations existing between that country and America. Russia is willing to withdraw the retaliatory duties on American machinery. The restriction has worked injury to Russian industry and agriculture, and the only prospect of delay in settling the difficulties lies in a desire to consult M. Witte, who was minister of finance when the duties were imposed and who is the most prominent political figure in Russia today. He is now in this country to act as one of the peace commissioners.

CONSTANT SPEED INDUCTION MOTOR.

The Commercial Electric Co., Indianapolis, has placed on the market a constant speed induction motor. This is in addition to the line of direct current motors which the company manufactures. The motor, which is shown in the accompanying illustrations, is built in all standard sizes, voltages and frequencies, and for both two and three phase systems, at 25 and 60 cycles.

The motors are built with a minimum clearance between the stator and rotor. The design of the stator frame and

"COMMERCIAL," CONSTANT-SPEED INDUCTION MOTOR.

the stator head are such that an equal division of this clearance is secured and maintained, it being impossible to assemble the machine in such a manner as to give the rotor an unequal air gap on opposite sides. In order to reduce the wear of the rotor shaft to a minimum, very large bearing surfaces have been provided. The bearings are self-oiling and self-aligning and are arranged so that the

"COMMERCIAL," CONSTANT-SPEED INDUCTION MOTOR, WITH ROTOR REMOVED.

machines may be conveniently inverted, when so desired.

The shafts are of crucible steel and are of large diameter, the distance between bearings being reduced to a minimum, making the shafts very rigid and not easily sprung. All shafts are ground to gauge and the bearings are carefully polished. Ventilating apertures are provided across the stator and rotor cores so that a free current of air is secured, thereby insuring cool operation. The starting devices used in the motor are so arranged that the starting current is reduced to practically that used in the direct current motors of corresponding capacities.

A PROCESS OF USING FLUE DUST AND FINE ORES.

A process of utilizing the fine ores and ore-dust which are carried over into the downcomers, dust-catchers, flues and other passages of a blast furnace is the subject of two patents awarded to Charles S. Price, general manager of the Cambria Steel Co., Johnstown, Pa. In the operation of blast furnaces, especially those which use fine ores, large quantities of ore-dust are carried into the various parts of the furnace and are usually wasted. Not only is the actual loss of the ore an item of considerable expense, but to this expense must be added that of removing the dust.

Flue-dust, although rich in iron, cannot be recharged into the blast furnace and smelted on account of the rush of gases caused by the powerful air-blast in the furnace carrying most of it again into the flues. Attempts have been made to utilize this valuable dust by mixing it with binding material and briquetting the mixture, but this has proved too expensive a process to be carried out on a large scale.

In Mr. Price's process, this flue-dust is utilized by mixing a certain quantity of it with a small portion of clay in a pug-mill or in any other contrivance that will effect a thorough mixing of the ingredients. The mixture is moistened with water and is formed into bricks or lumps in an ordinary brick machine or similar apparatus. The use of ground clay is preferable, although clay in lumps or other natural conditions may be used. It has been found by experiment that the mixture of clay and iron ore or flue-dust when made into plastic and coherent lumps by the addition of just enough water for the purpose may be charged directly into the blast furnace with good results. This obviates the necessity and expense of molding it into brick form and drying it in an oven. This method of using the moist and plastic mixtures in lump form renders commercially possible the utilization of flue-dust or fine ores, which could not be accomplished otherwise on account of the expense connected with a more complicated operation.

The proportion of flue-dust to clay is varied according to the iron contents of the flue-dust, and the mixture contains enough moisture and sufficient clay to provide a plastic compound which will not be blown out as dust after it is charged into the blast furnace. As clay is a material which varies in the same locality it is impossible to prescribe a proportion of clay to iron which will give the best results, with regard to the strength and coherence of the lumps and other properties desired. The fine ores and the flue-dust also vary in their chemical properties and degrees of fineness of their various particles, so that with even a comparatively uniform clay a different proportion of clay to flue-dust might be desired in order to accomplish good results.

In general, one part of clay suffices for eight parts of flue-dust or fine ore, together with the proper proportion of water to make a coherent lump. The amount of clay is small compared with the total charge of the furnace and should be useful in serving to increase the quantity or regulate the quality of cinder, as required in many cases. The mixture, it is stated, is much easier to smelt than the lean ores which are sometimes used for the same purpose. The clay, being a silicate of alumina, contains more silica than alumina, and a quality which has been found to be satisfactory contains about 62 percent of SiO_2 and 18 percent of Al_2O_3, together with moisture and a few other substances. The clay should not injure the lining of the furnace or produce any other deleterious effects, and the saving in ore cost should more than offset the extra cost of coke and limestone required to smelt the added clay.

A REINFORCED CONCRETE SEWER PIPE.

The Jackson Cement Sewer Pipe Co., Jackson, Mich., are the patentees and makers of a reinforced concrete conduit and sewer pipe, which presents some novel features. The pipe is constructed of concrete, reinforced by iron rods running longitudinally of the pipe. The particular feature of interest, however, is the method of making the joints between the various sections of pipe. The reinforcing bars are looped at the ends, and an iron band is placed around the circumference of the joint, and through the loops in the reinforcing bars. The bands prevent the different sections from separating, and after the joint is cemented over it is water tight, and the pipe is practically one continuous piece. The joint, being reinforced by the band and loops is as strong as any part of the pipe.

An advantage claimed for this type of pipe is that it may be constructed in molds along the line of the work, thus doing away with freight charges and cartage.

The strength of reinforced concrete construction in this class of work is shown in the accompanying illustration. The pipe shown is three feet in diameter, and is ninety days old.

Among the advantages claimed by the makers for this type of pipe are: low first cost of construction and installation; it is both frost and root proof, becoming harder with age; it is absolutely water tight, there being no possibility of breakage at the joints.

The reinforced concrete pipe is finding wider application than the construction of sewer pipes. It is coming into favor as a substitute for iron pipe in the construction of culverts, and for low pressure water pipes.

REINFORCED CONCRETE SEWER PIPE, 36 INCHES IN DIAMETER, SUSTAINING A LOAD OF 20,000 LBS.

Reclamation of the Yuma Desert.

One of the most difficult irrigation undertakings of the present day is the proposition to transform 85,000 acres of the arid Yuma Desert into fertile farming land. The U. S. Reclamation Service has awarded the contract for this work to J. G. White & Co., Inc., New York. The project presents almost insurmountable difficulties in many ways. The nearest town is the city of Yuma, located 12 miles down the Colorado river. Suitable drinking water is extremely scarce, and the summer temperature in the Yuma Desert ranges from 100 to 120 degrees. A modern camp will be built, and will be controlled by special officers employed by the contractors, or by the government police of the Indian reservation. It will be equipped with a complete refrigerating system to provide ice and cold storage.

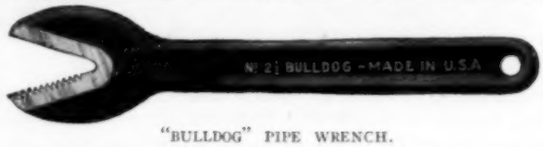
The transportation difficulties will be overcome to a great extent by the use of a 30-ft. gasoline launch to run as an express boat between the dam and the city of Yuma. Barges and other floating equipment will be used to transport heavy supplies. At the dam, there will be installed a telephone and telegraph system which will furnish constant communication with the city of Yuma.

At a point where the Colorado river forms a dividing line between the state of California and the territory of Arizona, a dam one mile long will be built across the river. The contractors estimate that the work will require the removal of over 300,000 cubic yards of solid rock excavation and 300,000 cubic yards of lighter material. The rock will be afterwards used for filling in the dam. Three vertical concrete core walls in the interior of the dam will require 30,000 cubic yards of concrete and 50,000 linear feet of sheet piling. On the face of the dam will be required 80,000 cubic yards of rock paving.

Very little work can be done during the time of heavy floods, and the construction is to be pushed rapidly this fall and winter so that the dam may be finished before the wet season of 1906. To facilitate construction, large orders have already been placed for prompt shipments of the elaborate equipment necessary to successfully complete the work. Work was begun by the company engineers within a few hours of signing the contract.

A New Pipe Wrench.

The Whitman & Barnes Mfg. Co., having factories at Chicago, Akron, Ohio, and St. Catharines, Ont., has recently added to its line and is placing on the market its No. 2½ "Bull-Dog" wrench, which is shown in the accompanying illustration. This wrench has a length of 12½ in., holds pipe from ⅜ in. to 1 in. in diameter, and round iron from ⅝ in. to 1¼ in. in diameter. It is drop forged from special steel which the manufacturers have made to their own analysis, and is nicely finished in black with polished jaws.



"BULLDOG" PIPE WRENCH.

New Wellman-Seaver-Morgan Branch.—The Wellman-Seaver-Morgan Co., Cleveland, has established a branch office at No. 216 Dooly Block, Salt Lake City. Harry V. Croll, M. E., has been appointed manager.

NEWS FROM MANY INDUSTRIES.

New Buyers :—

The McIntosh Foundry & Machine Co., of Monmouth, Ill., has been incorporated with a capital of $10,000. The incorporators are: A. D. McIntosh, W. A. Miles and J. F. Duffin.

The Gilchrist Machine Co., Madison, Wis., has amended its charter, increasing its capital from $750,000 to $1,250,000. Carl A. Johnson is vice president and Hobart S. Johnson, secretary.

A $100,000 stock company has been organized in Bucyrus, O., to establish a plant for the manufacture of steel castings. The company will put up a modern plant of 40 tons daily capacity. The entire capital is held by Bucyrus people. Construction will be commenced early in September.

The Hartwick Machine Co., Jackson, Mich., has been incorporated for the purpose of manufacturing and selling machinery. The company is capitalized at $21,000. The stockholders are: George Scheiffler, George McKeel, E. E. Hartwick and F. W. Hartwick, all of Jackson.

The Girard Boiler Co., New York city, has been incorporated with a capital of $100,000, by A. O. Girard, R. B. Wilhelm and H. L. Stueler, of Brooklyn.

The Dayton Pneumatic Tool Co., Dayton, O., is in the market for new drop forge dies for their hammer handles, and is asking for figures. Correspondence should be directed to the office at Wayne and State streets, Dayton, O.

The Leslie Co., Valley Brook avenue, Lyndhurst, N. J., has been incorporated with a capital of $200,000 to manufacture pressure regulators, reducing valves, safety valves, etc. The incorporators are: John S. Leslie, Jules P. Metzger and S. Inglis Leslie, all of Paterson, N. J.

The Chase & Mathewson Co., Buffalo, N. Y., has been incorporated with a capital of $50,000, to manufacture belts and belting. The incorporators are: John L. Chase, Rufus Mathewson, Robert S. Cox and William R. Smith, all of Buffalo.

The Scoville Check Valve Co., Ashtabula, O., has been incorporated with $20,000 capital stock by C. L. Scoville, W. R. Flower, M. A. Soules, Albert Strauss and H. Starkweather.

The Ross Stoker Co., of Hempstead, N. Y., has been incorporated to make and sell machinery of all kinds. The capital stock is placed at $60,000. The directors for the first year are: John E. Dackendorff, 204 West Eighty-sixth street; Allan A. Swingley, Cadillac hotel, both of New York, and William A. Ross, Rockville Center, L. I.

The Superior Coal Co., New York city, has been incorporated to mine and deal in coal and ores. The capital is $3,500,000. The incorporators are: Samuel B. Lawrence, J. B. Summerfield, Henry C. Everdell, Henry M. Haviland and Stephen A. McIntire, all of New York city.

The Clark Electric & Mfg. Co., New York city, has been incorporated to manufacture electric machinery and supplies. The directors are: G. W. Kyburg, T. J. Conry and A. P. Nevin, all of New York city.

The Colby Bessemer Iron Co., Milwaukee, Wis., has been incorporated.

North Birmingham Forge Co., North Birmingham, Ala., has been incorporated by J. H. Minge, W. E. Nichols and E. J. Smyer. The capital stock is $20,000. The company will erect a forge and foundry at once at North Birmingham.

W. B. Knight Machinery Co., St. Louis, has been incorporated to manufacture machinery, tools, hardware, patterns, dies and metal goods. The capital stock is $10,000, and the incorporators are: Albert K. Ebersole, Edward S. Knight and William B. Knight.

The Roth Jack & Tool Co., New York city, has been incorporated with a capital stock of $250,000. The directors are: C. E. Roth, O. B. Bergstrom, C. R. Cook and W. R. Elliot, of New York, and Henry A. Taylor, of Milford, Conn.

The Shaw Crucible Steel Co., of Hoquiam, Wash., has been incorporated with a capital of $100,000. The incorporators are: William J. Shaw, of Hoquiam; G. E. Shaw, John A. Ringold, S. Percy Wells and A. R. Witham, of Cincinnati.

The John L. Parker Co., makers of pressed metal wares, has been incorporated in Massachusetts with a capital of $22,000. Frank R. Jones, of Worcester, Mass., is president, and John M. Kendall, of the same place, treasurer and clerk.

The Hopcroft Development Co., New York, will manufacture a patented machine. The capital is $50,000, and the incorporators are: H. M. Angle and Edward V. Fleming, of Brooklyn, and George S. Jacob, of Ocean Grove.

The Buffalo Concrete Mixer Co. will manufacture machinery for contractors, etc. The capital is $75,000, and the incorporators are: Carlton E. Ladd, Medford B. Farrington, Maria Knowles, Lillian K. Knowles, Daniel S. Murphy and Dethloffs E. Klein, all of Buffalo.

The Porto Fiber Co., New York, has been incorporated with a capital of $50,000 to manufacture boilers, engines, tools, steam packing, etc. The incorporators are: J. Frank B. Vermilya, Sydney A. Williams and Edna A. Nash, all of No. 35 Nassau street, New York.

The Rhatische Bahn in the Engadine, Switzerland, is in the market for ten new narrow-gauge locomotives. A sum has also been set aside for the purchase of 62 cars of different sorts.

The Southern Connellsville Coke Co., Harrisburg, Pa., has been incorporated with a capital stock of $300,000. It will operate a tract of coal in Nicholson township. The directors are: W. C. Magee, Pittsburg; I. W. Semans, George Whyel, S. I. Harry, Thomas Morrison, I. H. Brownfield and James Henderson, of Uniontown, and John Husband, of Mt. Pleasant.

The D. Connelly Boiler Co., Cleveland, has been incorporated with a capital stock of $100,000, by Daniel Connelly, C. E. Schaffer, W. C. Connelly, L. E. Connelly and Kate Connelly.

The Cleveland Steam Boiler Works Co., Cleveland, has been incorporated with $5,000, capital stock, by Daniel Connelly, C. E. Schaffer, W. E. Connelly, L. E. Connelly and Kate Connelly.

The Colonial Hardware Co., New York city, has been incorporated with a capital stock of $30,000, by Clifton E. Harris and James J. Nolan, New York city, and Josiah Quincy, Boston.

The Perry Stove Co., of the Borough of Queens, New York city, has been incorporated with a capital of $50,000. The directors are: Albert Rathbone, Arthur H. Van Brunt, and W. M. Wilson, New York city.

The Connecticut Computing Machine Co., New Haven, Conn., has been incorporated with an authorized capital stock of $600,000. The incorporators are: Lieutenant Governor Rollin S. Woodruff, Max Adler, John T. Manson, Fred M. Carroll, John S. Bradley and Dwight W. Blakeslee, of New Haven; Charles M. Jarvis, Charles Glover, Philip Corbin, Andrew J. Sloper and William H. Hart, of New Britain; J. H. Whittemore, of Naugatuck, Charles F.

Booker, of Ansonia; W. H. Lyon, of Meriden, and William C. Lathrop, of Shelton.

The Isthmian Canal Commission will soon ask for bids for the equipment for the instrument repair shops on the Isthmus of Panama, including eight engine precision lathes, one traverse milling machine, threading tools, etc.

The Baltimore Foundry Co., manufacturer of machine ornamental structural castings, Baltimore, Md., wants to know the price, space occupied and time necessary for delivery of blowers for an 8-ton cupola and a 14-ton cupola. The blowers are to be run either separately or together.

The Security Vault & Machine Works have been incorporated at Portland, Ore., with a capital of $10,000. W. M. Martgall, A. O. Taylor and W. W. Waite are the incorporators.

The Toledo Boiler Works Co., Toledo, O., has been incorporated with a capital of $100,000. The incorporators are D. D. Flaner, A. W. Chesbrough, W. F. Day, E. W. Newton and J. H. Wagenhorst. The new company is a reorganization of, and will take over the business of the Toledo Boiler Works. An election of officers will probably be held about Sept. 1st.

The Wemlinger Steel Piling Co., New York, has been incorporated with a capital of $100,000. The directors are: Julius R. Wemlinger, Brooklyn; Jos. N. Scranton, East Orange, N. J., and Arthur W. Ransome, Clifton, Staten Island.

The Iron Workers' Supply Co., Brooklyn, has been incorporated to manufacture and deal in iron and steel structural supplies. Capital, $3,000. The incorporators are: William Kasper, Frederick Koetzle, and Abraham A. Phillips Jr., all of Brooklyn, N. Y.

New Construction:—

The Youngstown Sheet & Tube Co. has awarded contracts to the William Tod Co. and the United Engineering & Foundry Co. for the equipment of its new mills and buildings, which are now in the course of construction.

Milliken Bros., New York, have secured the contract for the new Singer Mfg. Co. building at Elizabethport, N. J., which will require 3,000 tons of steel. They have also other contracts requiring 1,200 tons of structural material.

The addition to the Lloyd Booth plant of the United Engineering & Foundry Co., a new building 70 x 100 ft. is being rapidly erected.

The Oliver Iron Mining Co., Peninsular, Mich., is preparing to erect a new machine shop which it is intended shall be modern in every respect.

The London Tool Co., London, Canada, has purchased property in Hamilton with a view of locating there.

The Grand Rapids Foundry Co. will build a one-story brick foundry building, 100 x 100 ft. to cost $6,600, in Grand Rapids.

The Browne-Sharpe Mfg. Co., of Providence, R. I., is adding another story to its No. 4 building, making it six stories in all, and putting up an addition to its No. 2 building, which will practically double the capacity. It is also erecting a building which will be called building No. 5, and will be connected with the No. 4 building by a bridge across the street. This new work will be soon completed.

The Meyer Machine Co., Petersburg, Ind., purchased the implement business of Paterson & Miley, recently, and is making preparations to enlarge its plant.

The United States Furnace & Foundry Co., manufacturer of heating furnaces and sanitary appliances, whose principal office is in Pittsburg, has just completed arrangements for the erection of a new plant at Darlington, Beaver county, Pa. The plant is to be completed by Oct. 1, and will be strictly up to date in arrangement and equipment. Electric transmission of power, compressed air, molding machines and pneumatic tools will be used.

The Asbury Graphite Mills, at Asbury, Warren county, N. J., are being remodeled and enlarged. This is the fourth time it has been necessary to increase the capacity of these mills since they were founded 10 years ago.

F. E. Myers & Bro., Ashland, O., are erecting an addition to be used for foundry purposes. They are also erecting a new machine shop.

Seward & Co., foundrymen, of Bloomington, Ind., have purchased the machine shops of Edwin R. Fletcher, and will locate their foundry on that site. Their old plant, which is in the center of the town, will be disposed of for business purposes.

The Wm. Bailey Co., of Springfield, O., will build an addition which will double the capacity of its foundry.

The United Iron Works Co., of Aurora, Mo., is planning to erect a new foundry building.

J. Hartman, of Tampico, Mexico, will establish a modern foundry and machine shop in the near future.

The Buckeye Steel Castings Co., Columbus, O., has found it necessary to make preparations for a large number of additions and improvements in its plant, owing to the heavy rush of business.

The Baldwin Locomotive Works, Philadelphia, has purchased property on which there now stands a four-story machine shop and storage building. This purchase brings an entire square under the control of the locomotive works, and will provide room for the enlarging of the plant.

The Lima Electric Railway and Light Co., has purchased land in Lima valued at about $13,000, on which it will erect a new car building, machine and paint shops.

The Pittsburg & Lake Erie railroad has decided to erect a new freight car repair shop at a cost of $100,000 at McKees Rocks, Pa. The Hill Construction Co. will build that part of the superstructure not included in the steel frame work, and the McClintic-Marshall Construction Co. will do the latter.

Palmer Bros., builders of gasoline engines at Cos Cob, Conn., are erecting a foundry to supply the small parts required in their shops. One 30-inch cupola will be installed.

The Computing Machine Co., organized under the laws of Connecticut and representing New Britain capital, is looking for a site in that city with the view of erecting a factory.

The Skinner Chuck Co., of New Britain, Conn., is enlarging the floor space by elevating the roof on the older portion of the building and introducing an eleven-foot story. This will give a continuous floor 160 x 40 ft. the entire length of the building. An eighty-foot addition to the main structure is in contemplation but not yet decided upon.

A statement in our issue of last week to the effect that the Continental Iron & Steel Co. was to erect a steel plant at Rahway, N. J., is incorrect. The Continental Iron & Steel Co. is defunct and the rumor is without foundation.

The new foundry building to be erected by the Twentieth Century Heating & Ventilating Co., Akron, O., is to be a thoroughly modern one, 86 x 300 ft. The company has about seven acres of land and is well equipped with power apparatus and protective facilities. It is expected that the new foundry will be ready for occupancy Jan. 1, 1906.

Fires:—

A fire in which the old machine shop, pattern storage room, and engine room of the Theodore Smith & Sons

Co., were destroyed, caused a damage of from $80,000 to $100,000. The loss of the firm is about $40,000, the plant being crippled because of the destruction of boilers and engines.

The Pittsburgh Pulley Co., Crafton, Pa., suffered a loss by fire of $85,000. The loss was covered by insurance.

The Richter Electric Works, Front and Federal streets, Camden, N. J., was severely damaged by fire on July 28.

The Bartlett Steel Works, Joplin, Mo., was completely destroyed by fire Aug. 3. All the machinery was ruined and the loss is estimated at $15,000.

The plant of the Tower Grove Iron Co., St. Louis, was visited by fire recently, which caused a loss of $1,500.

Fire destroyed the building occupied by the Davidson Foundry Co., Maywood, Ill., entailing a loss of $3,000.

General Industrial Notes:—

The consul-general at Rio de Janeiro, Brazil, Eugene Seeger, in a letter to Washington states that there are parties in that city who seek to represent some American steel producing company in that country. He states that with such a favorable opening as the present opportunity affords, prospects for an American company are very bright there. Information can be obtained from the bureau of manufactures at Washington, or by addressing Eugene Seeger, consul-general, Rio de Janeiro, Brazil.

The American Roller Bearing Co., has moved to South Farmingham, Mass., its Boston plant being recently destroyed by fire.

Five of the ten mills of the Newport, Ky., rolling mill are again running, after a shut down of about one month.

The Lancaster Malleable Iron Works, Lancaster, N. Y., is to be remodeled and equipped as a first-class malleable casting plant by the American Brake Shoe and Foundry Co. It will be operated as a separate corporation, subsidiary to the Brake Shoe & Foundry Co., and will be known as the American Malleable Iron Co.

The International Non-Explosive Tank Co., 140 Nassau street, N. Y., recently incorporated, is to manufacture and sell a device for rendering benzine, gasoline and similar explosive containing tanks absolutely non-explosive. The officers of the company are: William O'Gorman Jr., president; Louis Kessler, vice president; Chas. Frankenstyne, secretary, and Philip J. Levi, treasurer. The factory is located at 209 Center street, New York city, and will be in operation very soon.

The Cuyahoga river at Cleveland is to be deepened and straightened as far up as the furnace of the Cleveland Furnace Co., which will be a great advantage to some of the ore boats which are now unable to proceed that far.

The Whitaker iron mill, Wheeling, W. Va., which has been closed for a considerable length of time, is about to resume operations.

The LaBelle Iron Works, Steubenville, O., is about to put in operation its new 84-in. plate mill just completed.

After an idleness of one year the Anderson-DuPuy mills of the Crucible Steel Co., at McKees Rocks, Pa., has resumed work, though operations will not be continued for a longer time than is required by the conditions of its lease.

The Means & Fulton Iron Works, Birmingham, Ala., has changed its name to the Birmingham Engineering & Casting Co., with an increase of capitalization of $75,000.

The Gisholt Machine Co., Madison, Wis., machine tool manufacturers, has just completed arrangements for acquiring the plant of the American Turret Lathe Co., of Warren, Pa. The company has been reorganized with an increase of capital stock from $750,000 to $1,250,000.

On Aug. 6 the tool and forging business of A. W. Marcy, of Putnam, Conn., was succeeded by The Marcy Tool Works, with A. W. Marcy as manager. This firm will continue to manufacture a line of forgings, lathes, planer and shaper tools, cold chisels, caulking and pointing tools for hand use and pneumatic hammers.

The rolling mills of Moorehead Bros., at Sharpsburg, Pa., have been closed down because of lack of metal. Some 250 men are thrown out of employment as a result.

The Standard Metalwork Co. has been instituted by the G. H. Bushnell Press Co., Thompsonville, Conn., for the purpose of conducting the manufacture of large pipe bends with improved joints for high pressure steam service and difficult metalwork generally, including steam superheaters, condensers, feed water heaters, as well as appliances for refrigerating, evaporating, distilling, etc. James A. Colvin, proprietor; Mark Worth Bushnell, business director and James Acton Miller, mechanical engineer and director, the latter having been engaged a number of years in above class of special work.

Trade Notes:—

Hill-Clarke & Co., of Boston, Mass., state that notwithstanding the fact of it being vacation season, the orders are coming in freely and all signs point to a decided increase in the general tool business.

The Locke Steel Belting Co., of Bridgeport, Conn., has recently completed its large contract for this season with The International Harvester Co., covering steel chains for 50,000 machines. The International Harvester Co. uses the Locke Steel Belting Co.'s stamped steel chain belting on all types of its machines, which are shipped to every portion of the globe.

The Coosa Pipe & Foundry Co. is now making soil pipe at its plant just completed at Gadsden, Ala. The capacity of the plant as at present constructed is twenty-one floors, with a daily output of 50 tons. If the plant should prove profitable, increases will be made in the output. The Coosa Pipe & Foundry Co. is one of the offsprings of the Alabama Consolidated Coal & Iron Co., and it is intended to erect other concerns looking to the providing of a home market for pig iron manufactured at three blast iron furnaces. The new pipe concern so far looks like a success and quite a number of orders are in sight. This new industry will give employment to about fifty hands and later on considerably more.

A. G. Hathaway & Co., Cleveland, report that business in the last two weeks has picked up considerably. They have more orders on their books now than they have had for the last six weeks. Business is exceptionally good in heavy melting steel and relaying rail. The market for forging axles is just fair. They expect to see much better business this fall than they had last year.

The contracts given to the American Bridge Co. by the New York & Hartford railroad will aggregate $1,300,000.

The Acme Metal & Machine Co., Fort Worth, Texas, whose incorporation was mentioned in *The Iron Trade Review* recently, is a manufacturer of metals and machinery. The firm also does an extensive business in general repairing, selling and exchanging new and second-hand machinery, besides carrying a full line of supplies.

The Kirkwood Iron & Steel Co., Toronto, Canada, has completed a new rolling mill for making bar iron and steel in Winnipeg. The capacity is 50 tons per day and the raw material used is wrought scrap.

The Pusey & Jones Co., Wilmington, Del., has shipped this month 30 carloads of machinery to Finland, where it

will be erected by representatives sent from this country.

The Chandler & Taylor Co., Indianapolis, Ind., has recently secured contracts for the installation of its enclosed self-oiling direct connected engines for Purdue University, the Indiana State Normal School, the Girls' Industrial School and the Michigan College of Mines. These engines are built along the lines recommended by the American Society of Mechanical Engineers and the American Institute of Electrical Engineers for direct connected units.

The Independent Pnuematic Tool Co., with offices at Chicago, has acquired the Aurora Automatic Machinery Co. and reports an unusually large business in the various "Thor" air tools which it manufactures. Its offices have been moved from 1236 to 1255-6-7 First National Bank building.

The A. S. Cameron Steam Pump Works, New York city, is advertising its products by means of two handsome bookmarks. These are made of celluloid and are printed in colors with appropriate designs, consisting of a Scotch bagpipe player, and a Scotch girl, both attired in the Cameron plaid.

John F. Allen, 370 and 372 Gerard avenue, New York city, manufacturer of the "Allen" riveting machines, reports a steady demand for these standard tools. July sales were as follows: Jeffrey Mfg. Co., Columbus, O.; Thompson Iron Works, Philadelphia; Owego Bridge Co., Owego, N. Y.; Manning, Maxwell & Moore, New York; Levering & Garrigues Co., Dunnellen, N. J.; Morava Construction Co., Chicago; New Castle Bridge Co., Indianapolis; Interstate Engineering Co., Bedford, O.; American Car & Foundry Co., Wilmington, Del.; Sheboygan Boiler Works, Sheboygan, Mich.; American Car & Foundry Co., Jeffersonville, Ind.

The Republic Iron & Steel Co., bought on August 5 a tract of land of 57 acres on the south side of the river near Youngstown, O. The new land will probably be the site of the contemplated additions to the Republic's plant.

The Detroit, Toledo & Ironton has placed an order for 10,000 tons of steel rails with the Carnegie Steel Co.

The Pratt & Whitney Co., Hartford, Conn., will hereafter be represented in southwestern territory by C. T. Patterson & Co., New Orleans, La.

Boiler shops to cover a space of 135 x 210 ft. are being erected at the Ecorse plant of the Great Lakes Engineering Works. The new plant will be modern in every respect and all the machinery will be run by electricity, compressed air or hydraulic power.

The New Britain Machine Co. expects in the near future to place upon the market several new specialties for the machine shop, among others a band saw filing device, a steel rack and an improved bench with metal frame.

The George H. Gibson Co. is a partnership formed by Halbert P. Gillette, M. Am. Soc. C. E., M. Am. Inst. M. E., and Geo. H. Gibson, M. Am. Inst. E. E., J. M. Am. Soc. M. E. They will be known as advertising engineers with offices in the Park Row building, New York city. Mr. Gillette was formerly associate editor of the *Engineering News*, and Mr. Gibson, manager of publicity for the International Steam Pump Co., manager of the advertising department of the B. F. Sturtevant Co., and editor of the Westinghouse Co.'s publishing department. The object of the company is the presentation, for promoters of new things of value in the engineering trade, of those devices and improvements which experience has shown need advertising to bring them into commercial success within a time compatible with their engineering value.

TRADE PUBLICATIONS.

The Allegheny Forging Co., Pittsburg, is sending out its price lists of chain, plate washers, nuts, rivets, etc.

The De La Vergne Machine Co., New York city, is distributing a handsome folder illustrating the Koerting gas engine, which is manufactured by it.

Wyman & Gordon, Cleveland, O., and Worcester, Mass., have issued a booklet entitled "A Short Story of Nathan Read." This is one of a series of the lives of famous engineers which have been published by this company.

The Krips-Mason Machine Co., Philadelphia, Pa., is sending out little souvenir rules and paper cutters, advertising their business.

The American Drop Forging & Tool Co., Wayland, N. Y., is distributing price lists of the "American" pipe wrench.

The Cleveland Twist Drill Co., Cleveland, has issued a handsome catalogue illustrating a new line of tools made by it. These are tools for use in turret lathes and screw machines, and include drills, reamers of various types, tool holders, etc.

Crocker-Wheeler Co., Ampere, N. J., is distributing a booklet entitled "The Source of the Electric Light." It is devoted to a description of the Crocker-Wheeler motors and generators, and is illustrated with photographs of various installations.

The N. & G. Taylor Co., Philadelphia, has issued a booklet setting forth the advantage of the "Taylor Old Style" tin roofing.

T. E. Meyers & Brother, Ashland, Ohio, are distributing a catalogue describing their products. These consist of pumps and hay tools.

The Kilgore-Peteler Co., Minneapolis, Minn., has brought out a catalogue describing the dump cars manufactured by it. About twelve different styles are described and illustrated.

The Ingersoll-Sergeant Drill Co., New York city, is distributing a pamphlet describing the "Radialax" coal cutter. This is a machine designed for shearing and entry driving in coal mining, and for undercutting. The pamphlet is the first publication to describe it.

The Wilcox Mfg. Co., Aurora, Ill., has issued its catalogue No. 6 illustrating door hangers and hardware specialties. The book contains 160 pages and is well illustrated.

The Bollinger & Rieley Machine Co., Cleveland, Ohio, has issued a pamphlet describing the refrigerating machinery manufactured by it. The machines range in size from one to 150 tons capacity. Accompanying the pamphlet are a number of photographs of recent installations.

The Dayton Pneumatic Tool Co., Dayton, Ohio, is calling attention by means of illustrated cards to the Green pneumatic hammers made by it.

The S. M. Jones Co., Toledo, Ohio, is distrbuting catalogues describing the Acme gas and gasoline engines, and the Rathbun gas engine.

The Orford Copper Co., of 42 Exchange Place, New York city, has brought out a publication entitled, "Nickel Steel, Its Properties and Application." This is an authorized reprint of the paper by Albert L. Colby, which was read before the American Society for Testing Materials. In addition to the paper the discussion which took place in connection with the meeting has been printed. All who are interested in nickel steel or its applications will find this publication exceedingly interesting reading.

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Steam containing entrained moisture cannot do as much work expansively as dry steam. A Cochrane Steam Separator will take out the moisture coming with the steam—giving absolute protection against any large flush of water that may occur—and will enable you to utilize your steam to the best possible advantage—which means economy of steam, economy of coal, economy of money.

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The installation of a Cochrane Steam Separator is a paying investment because the economies obtained will more than cover the interest on the cost of the Separator, giving you your engine protection absolutely free.

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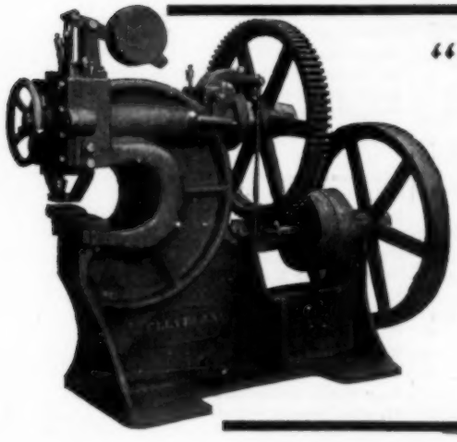

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†Bullard Machine Tool Co —
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†Burns Hydro-Carbon Burner Co —

Caldwell, H. W., & Son Co. 20
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††Canton Foundry & Machine Co 79
Carborundum Co —
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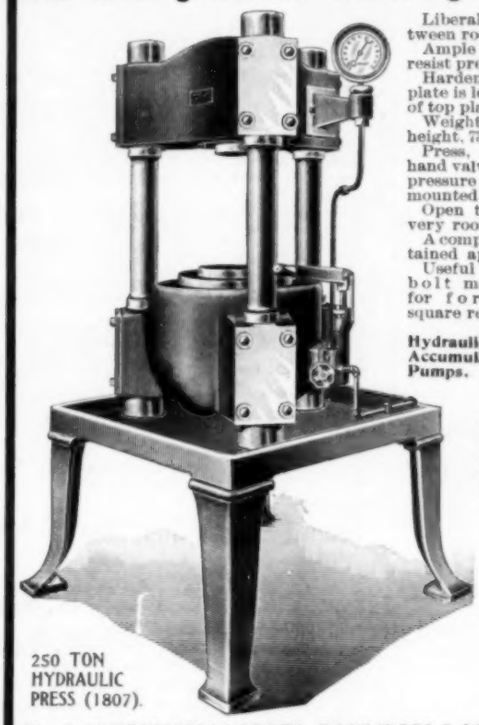

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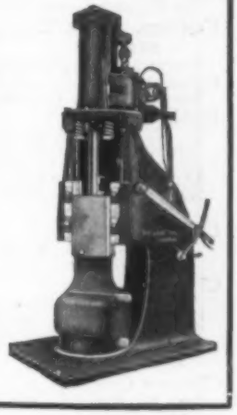

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Niles-Bement-Pond Co., New York.
Northern Engineering Works, Detroit, Mich.
The S. Obermayer Co., Cincinnati and Chicago.
Pawling & Harnischfeger, Milwaukee, Wis.
Craig Ridgway & Son, Coatesville, Pa.
Riter-Conley Mfg. Co., Pittsburg, Pa.
Russel Wheel & Fdy. Co., Detroit, Mich.
J. G. Speidel, Reading, Pa.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
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R. D. Wood & Co., Philadelphia, Pa.
Youngstown Engineering Co., Youngstown, O.

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Interstate Engineering Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Machinery Co., Chicago, Ill.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Mesta Machine Co., Pittsburg, Pa.
R. S. Newbold & Son Co., Norristown, Pa.
United Engineering & Fdy. Co., Pittsburg, Pa.
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Hill & Griffith Co., Cincinnati, O.
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Russel Wheel & Fdy. Co., Detroit, Mich.
The J. D. Smith Fdy. Supply Co., Cleveland.

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Mechanics Machine Co., Rockford, Ill.
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Chas. G. Smith Co., Pittsburg, Pa.
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Cincinnati Machine Tool Co., Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleveland.
Knecht Bros. Co., Cincinnati, O.
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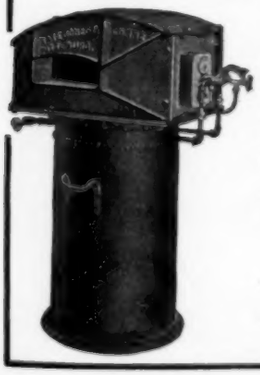

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McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
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Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Canton Foundry & Machine Co., Canton, O.
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Gobeille Pattern Co., Cleveland, O.
R. E. Kidder, Worcester, Mass.
The Macbeth Iron Co., Cleveland, O.
The Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
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The S. Obermayer Co., Cincinnati and Chicago.
J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.

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Hendrick Mfg. Co., Carbondale, Pa.

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Reed F. Blair & Co., Pittsburg, Pa.
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Columbus Iron & Steel Co., Columbus, O.
Corrigan, McKinney & Co., Cleveland, O.
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Robt. Field Sales Agency, Cincinnati, O.
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Hickman, Williams & Co., Chicago, Ill.
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Ernest Law & Co., Philadelphia, Pa.
J. Tattnall Lea & Co., Philadelphia, Pa.
McKeefrey & Co., Leetonia, O.
Pickands, Brown & Co., Chicago, Ill.
Pickands, Mather & Co., Cleveland, O.
Republic Iron & Steel Co., Chicago, Ill.
Richardson & Co., Pittsburg, Pa.
Rogers, Brown & Co., Cincinnati, O.
Scully Steel & Iron Co., Chicago, Ill.
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Chas. G. Smith Co., Pittsburg, Pa.
Vandyck Churchill Co., New York City.
Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.

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Dayton Pneumatic Tool Co., Dayton, O.
General Pneumatic Tool Co., Montour Falls, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
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Rand Drill Co., New York City.
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Presses—
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Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
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Chas. F. Elmes Eng. Works, Chicago, Ill.
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Great Lakes Engineering Wks., Detroit, Mich.
Long & Allstatter Co., Hamilton, O.
Mackintosh, Hemphill & Co., Pittsburg, Pa.
Morgan Construction Co., Worcester, Mass.
Niles-Bement-Pond Co., New York.
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Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
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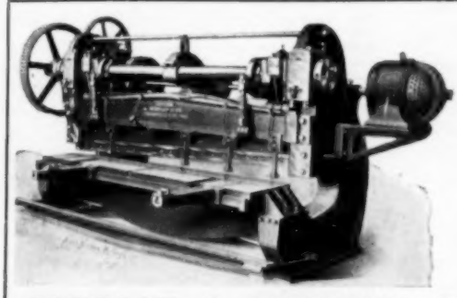

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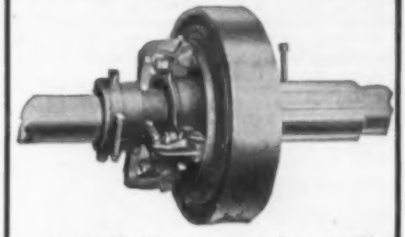

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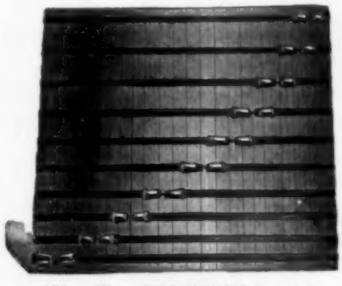

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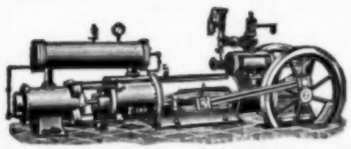

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S. Obermayer Co., Cincinnati, O.
Russel Wheel & Fdy. Co., Detroit, Mich.
The J. D. Smith Fdy. Supply Co., Cleveland.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
The Wellman-Seaver-Morgan Co., Cleveland, Ohio.

Tubes—
Bourne-Fuller Co., Cleveland, O.
S. Fix's Sons, Cleveland, O.
Globe Rolling Mill Co., Cincinnati, O.
National Tube Co., Pittsburg, Pa.
Joseph T. Ryerson & Son, Chicago, New York and Pittsburg.
Scully Steel & Iron Co., Chicago, Ill.
Shelby Steel Tube Co., Pittsburg, Pa.

Tube Welding—
S. Fix's Sons, Cleveland, O.

Tumblers—
The Adams Co., Dubuque, Ia.
The Globe Mach. & Stamping Co., Cleveland, O.
Hill & Griffith Co., Cincinnati, O.
Northern Engineering Works, Detroit, Mich.
The S. Obermayer Co., Cincinnati and Chicago.
J. W. Paxson Co., Philadelphia, Pa.
The J. D. Smith Fdy. Supply Co., Cleveland.

Turnbuckles—
Bourne-Fuller Co., Cleveland, O.
Cleveland City Forge & Iron Co., Cleveland, O.
A. G. Hathaway & Co., Cleveland, O.
New Jersey Fdy. & Mach. Co., New York City.
Republic Iron & Steel Co., Chicago, Ill.

Twist Drills—
The Cleveland Twist Drill Co., Cleveland, O.
The Whitman & Barnes Mfg. Co., Chicago, Ill.

Vises—
Hanna Engineering Works, Chicago, Ill.
Merrill Bros., Brooklyn, N. Y.
Wyman & Gordon, Worcester, Mass.

Washers—
American Iron & Steel Mfg. Co., Lebanon, Pa.
Avery Stamping Co., Cleveland, O.
A. G. Hathaway & Co., Cleveland, O.
Milton Mfg. Co., Milton, Pa.
Upson Nut Co., Cleveland, O.

Water Softening Plants—
Harrison Safety Boiler Works, Philadelphia.

Well Drilling Machines—
American Well Works, Aurora, Ill.

Wire (Cable and Rope)—
Lidgerwood Mfg. Co., New York City.

Wire Nail Machinery—
National Machinery Co., Tiffin, O.

Wrenches (Machinists' Drop Forged, &c.)—
Whitman & Barnes Mfg. Co., Chicago, Ill.

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NO FOUNDRY COMPLETE WITHOUT ONE.

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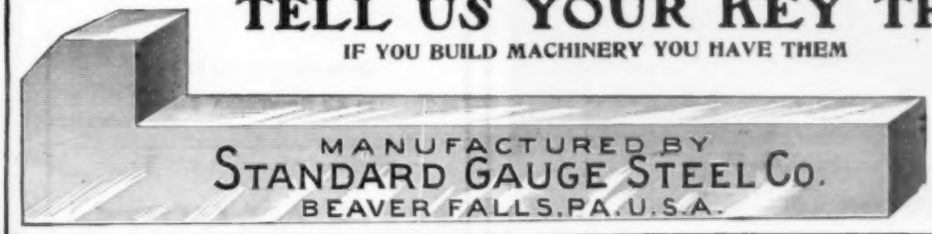
IF YOU BUILD MACHINERY YOU HAVE THEM



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A party was here today to see the Ridgway Steam Hydraulic. We took them out in the shop and had them ride on the machine and run it themselves and when done this is what they said "That's the stuff old man!"

And they gave us an order for an outfit of elevators at once.

Now, if we can in some way get you to see the Ridgway elevator the result will be just the same.

We have never had a case where a man who had to have an elevator purchased any other sort once he had seen the Ridgway Steam Hydraulic.

This advertisement is not for the purpose of taking orders for elevators. We simply want you to know about this remarkable elevator so that when an elevator proposition comes up you may be led to investigate for yourself and so find out what it all means to

"Hook 'er to the Biler."

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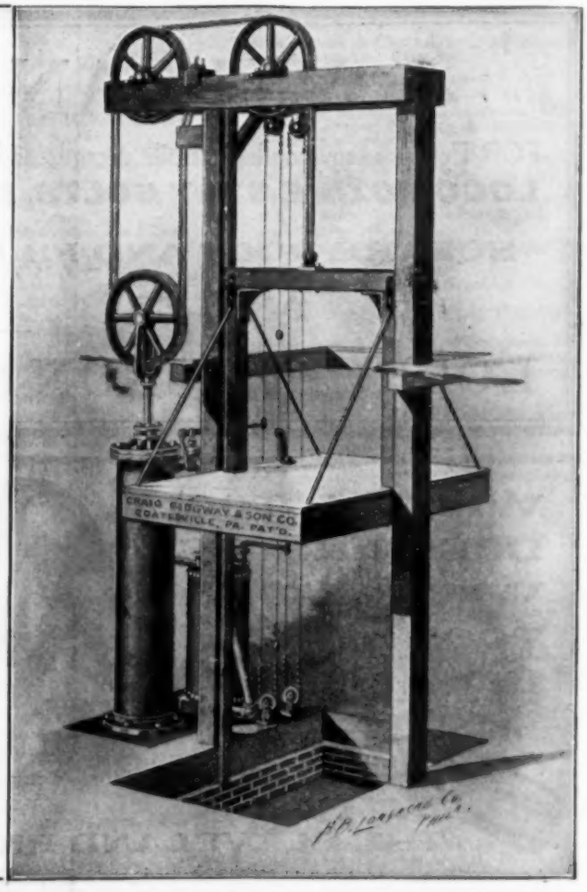
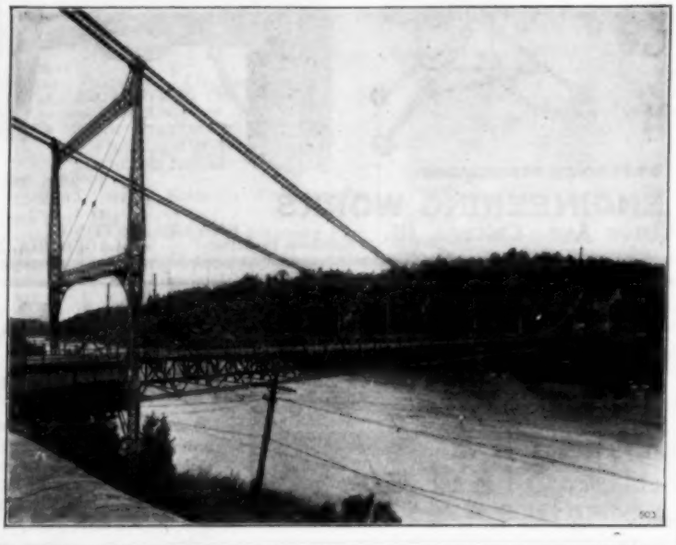
Coatesville, Pa.





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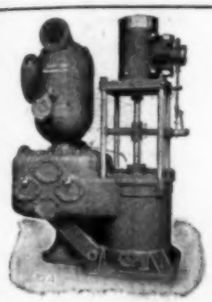

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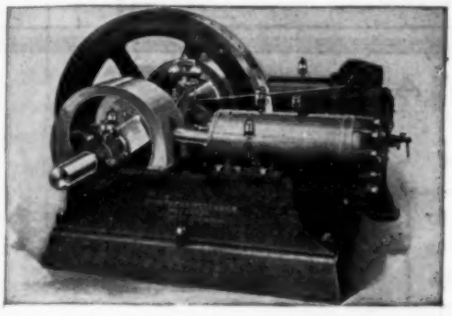

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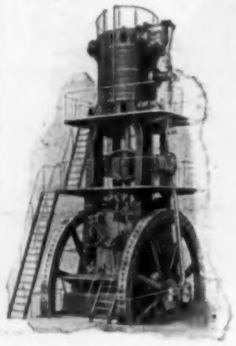

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